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HEALTH AND HEALTH PRACTICES

CUZZORT
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RUNNING BROAD JUMP

CUZZORT-TRASK HEALTH SERIES

HEALTH AND HEALTH PRACTICES

BY

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IN COLLABORATION WITH

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SURGEON, UNITED STATES PUBLIC HEALTH SERVICE

REVISED

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PREFACE

THIS text is developed after a plan that is successful with younger classes. Each section begins with a short health-impression lesson. The lesson is followed by supplementary readings. These are for the most part human-interest stories bearing on the health lesson. They show the significance of certain health impressions, and give them meaning through concrete settings. These readings bring *motive* to bear upon the health idea because they show the idea as *motive*. Many of the readings describe experiences of boys and girls, for children like to know about the doings of those who are like themselves.

The health lesson proper differs from those given in the earlier grades because the child has developed physically and mentally. He is ready for impressions about his bigger self and his new interests. His body has developed. His activities have increased many fold, and body-control and variety of performances open the way to the finest of ideals for a well-developed body. He does more to care for himself than formerly, and he can be systematic about it. Thus his impressions of the care needed to keep his body sound are greater in number and variety, and hygiene and sanitation have a new importance. The team game has come, showing that social activities and interests are growing. He learns that it takes coöperation for people to keep well and free from disease. Thus he gains many impressions of the value of a good body, and these need only to be expressed in simple language to serve as affective aids in preserving health.

When the child has completed this text along with the health-training program into which it fits, he will have grown toward an ideal of physical development and gained a vision that will remain with him.

PREFACE

The authors express thanks to Dr. Harry C. Oberholser, Ornithologist, for careful criticism of the Nature Study facts given in this volume; to Dr. N. E. McIndoo, of the U. S. Department of Agriculture, and Mr. N. Hollister, Superintendent of the Zoölogical Park, Washington, D. C., for nature study information contributed; to Prof. C. A. Metzler, Director Physical Education, High Schools, Washington, D. C., and Mrs. Glenna Smith Tinnin, Washington, D. C., for providing photographs illustrating physical development and physical training exercises, to Masters Fullerson, whose photographs illustrate posture and body performances, and to Frances Fuller, whose photographs appear in the last pages of the book.

Appreciation is expressed for material supplied by members of State Departments of Education, and for photographs from the U. S. Department of Agriculture.

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ATALANTA, THE RUNNING GIRL
From a Greek statue

HEALTH AND HEALTH PRACTICES

I. WE CAN HAVE STRONG BODIES

We can have strong bodies, for we can do things that make them strong. Our bodies are hungry to do things just as they are hungry for food. It is natural for them to do things. It is natural for them to have strength. They will grow stronger and stronger. We can have good bodies to live in nearly all our lives if we help make them good.

We may think we jump and run and play games just for fun, but we do these things because our bodies want to do them. We jump as far as we can and run as fast as we can because our bodies are hungry to do all they can do. When we let them do these things, we make them strong.

When we have done about as much as we can, we are tired. When our bodies are a little tired all over, they are ready to rest. As we grow stronger we can do more and more before we become tired. We should do enough to make our bodies a little tired each day. This is the way we make them strong.

We make our bodies a little stronger when we stand and sit. We make our arms stronger when we do things with our arms. But to make our whole bodies stronger we

must do things with our whole bodies. We do things with our whole bodies when we play running games, when we walk and climb and swim, and when we do some kinds of work.

Of course we all want the best bodies we can have. We do not want them to become weak before we have lived half of our lives. We can have good ones if we help them grow strong.

SUPPLEMENTARY READING

Theodore Roosevelt had a Frail Body as a Boy, but became a Man of Vigor

Theodore Roosevelt, our former President, was a frail boy, and he was still frail as a youth. In his story of his life he tells what led him to decide to make his weak body strong. He was at that time fourteen years old. Of this he writes:

“Having an attack of asthma I was sent off by myself to Moosehead Lake. On the stage-coach thither I encountered a couple of other boys who were about my own age, but much more competent and also much more mischievous. I have no doubt but that they were good-natured boys, but they were boys! . . . They proceeded to make life miserable for me. . . . When I finally tried to fight I discovered that either one singly could not only handle me . . . but handle me so as not to hurt me much. The experience taught me what probably no amount of good advice could have taught me. . . . With my father’s permission I started to learn to box. . . . I was a painfully slow and awkward pupil, and certainly worked two or three years before I made any noticeable improvement whatever.”

He was at that time living in New York City. But each fall and winter he used to go to the North woods where he could walk and climb in the wild out-of-doors.

Through his steady efforts to gain sturdy health, he had lost much of his early frailness before he went West to live as a rancher. Most of us remember him first as a Rough Rider. By this time he had become active and strong. We did not know the years of struggle in early life.

Theodore Roosevelt so succeeded in gaining the health he wanted that he not only rode and hunted over the broad Western lands of the United States but he served in our cavalry during the Spanish-American War and afterwards became a world hunter, hunting and studying wild animal life in North and South America, and other parts of the world. He was rider, athlete, hunter, author, statesman — and in all successful.



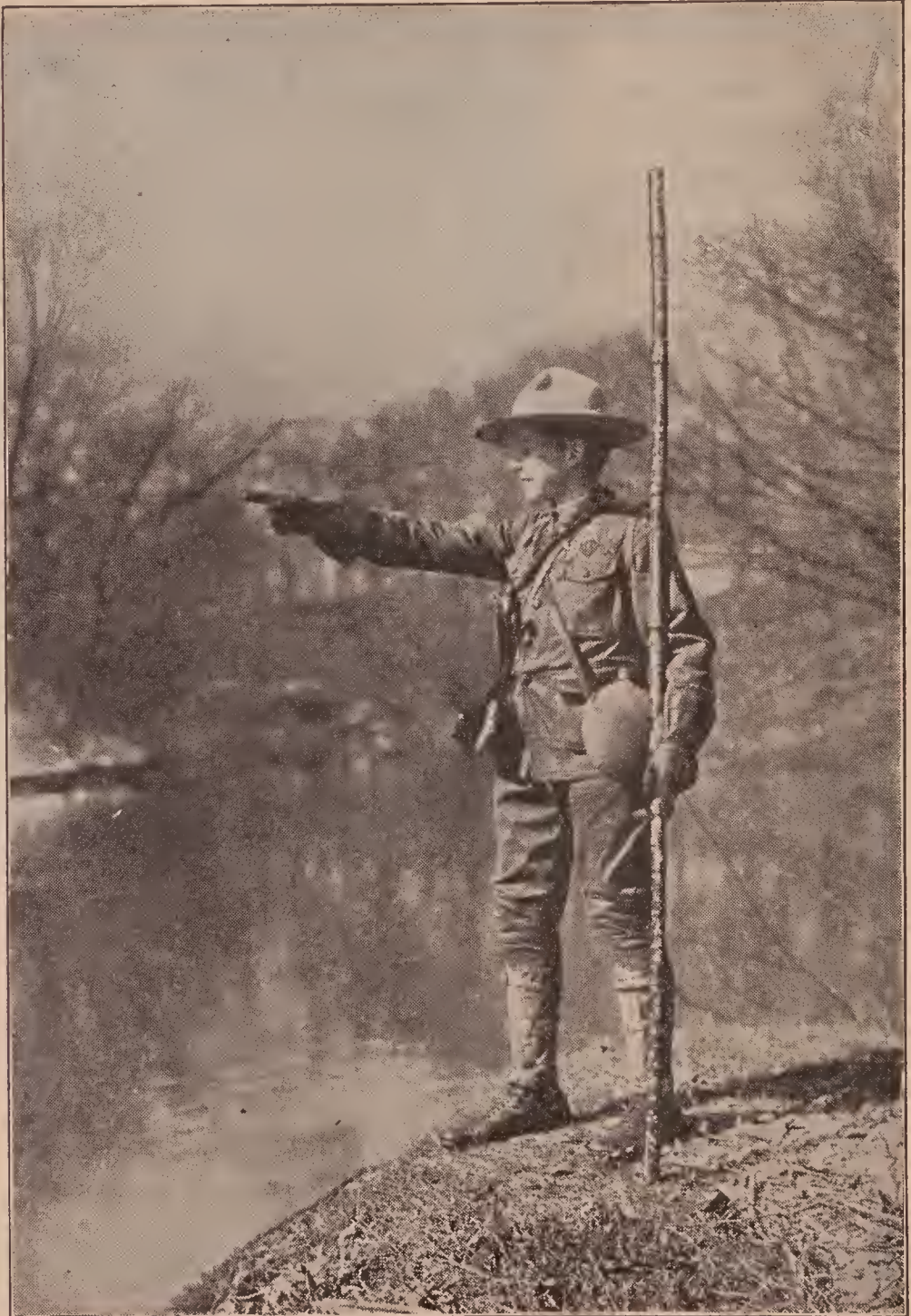
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THEODORE ROOSEVELT

A Boy Scout

Any boy twelve years of age or older who can show his ability to do a few simple things can by taking the scout pledge become a scout. As a beginning member he is called a Tenderfoot. While he is a Tenderfoot, he keeps the scout laws and learns to do what is required of a Tenderfoot scout. He takes the boy scout setting-up exercises to make his body stronger. But before he is

promoted to the Second Class, he must show that he can make a mile in twelve minutes, using the scout gait of walking fifty steps



BOY SCOUT

and running fifty steps. Before he can be promoted to a First Class scout he must be able to swim fifty yards, and must make a

round trip alone to a point at least seven miles away (fourteen miles in all). These are not all the requirements to be a First Class scout, but they are some of the important ones.

The point is that as the scout members are promoted from one class to another, they make their bodies stronger. They show this by what they can do.

A Girl Scout

There are also three classes in girl scouts, the same three that boys have. Girls become members of scout groups very much as boys do. Girl scouts are promoted for showing ability to do things and for giving service, just as boy scouts are. The girls, too, must make their bodies strong. They too play games and take setting-up exercises and camp out in the open when they can. A girl scout cannot be promoted to a First Class scout unless she can walk a mile in twenty minutes.

This does not mean that she is always to walk at this rate, for some naturally walk faster than others. It is only a way of testing how strong she has grown, and how well she can use her body.

QUESTIONS

1. What makes our bodies strong?
2. How is it that they grow strong naturally?
3. What do we do with our whole bodies?
4. Just what did Theodore Roosevelt's experience on the stage-coach teach him?
5. Most people when they go to the North woods go in summer. What do you think of his going in the fall and winter?
6. How did Roosevelt make his frail body strong?
7. Let the boys secure the *Boy Scout Handbook* and read "How to be Physically Strong," page 206 (1928 edition), and "Physical Development," page 429.
8. Let the girls study pages 429, 430 in *Scouting for Girls*.

REFERENCE.—If the book is in the school library, read Walter Prichard Eaton's *The Boy Scouts of Berkshire*.

II. WE WANT SOUND BODIES

We want sound bodies. We can have sound ones, for we can take care of them and keep them sound.

As we grow up we can keep our bodies sound. We do not need to let them be broken and diseased. We can keep every part of them sound.

If some parts are weak, we can have them made strong before they cause much harm. If any parts are diseased, we can try to help Nature cure them. We can take care of our bodies and keep them growing well and keep them healthy.

We can take care of our lungs and they will breathe easily.

We can take care of our eyes and they will let us see well.

We can care for our teeth and we will have good teeth to use.

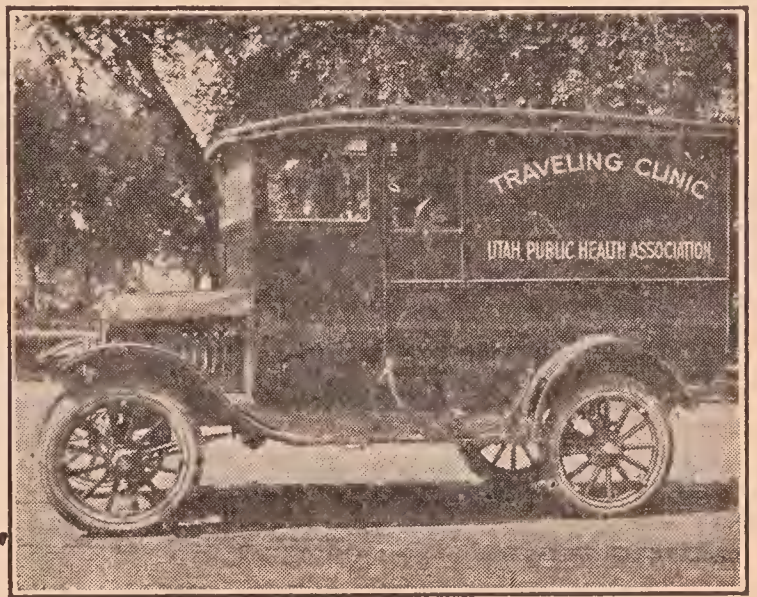
We can keep our blood healthy. We can have all parts of our bodies sound.

If we have sound healthy bodies, we can make them strong. Then we can do the things we want to do in work and play.

We should take as good care of our bodies as we can. If they are diseased, we should try to cure them before much harm is done. We should keep the bodies we live in all our lives as sound as they can be kept.

State Governments help in this large task. The United States was the first country in the world to establish in its National Government a children's bureau. This was in 1912. Some of the children who read this page are living and healthy today because of what this bureau did to give them a healthy babyhood. The Congress of the United States every year appropriates money to pay for the publication of bulletins furnishing information on how to keep healthy the nation's children. Does your State Government have a department of child welfare or child hygiene? You may discover at first hand what is done to help you keep your body sound by visiting a children's clinic. If there is not one in your community or at your school, find where the nearest one is. At the clinic the bodies of children are repaired. Holes in teeth are filled. Eyes are tested to see if the sight is good, and

ears to see if the children hear well. The doctor looks into the throat to see if there are adenoid growths or swollen tonsils. A nurse takes the weight. At some clinics and in some schools there is a nutrition class for children whose bodies from lack of the right kind of food or from other cause are not well nourished. Some clinics are on wheels. The traveling clinic goes from community to community. Some clinics are for babies only. Here a doctor or nurse will advise mothers how to keep their babies healthy. Sometimes the mothers and others of the community go to the clinic to learn the best care to give children, first aid, home care of the sick and other things.



Courtesy Utah Public Health Assn.

A TRAVELING CLINIC

10 HEALTH AND HEALTH PRACTICES

A place of this kind may be called a health center. The purpose of the clinic or health center is to help the people of the community, particularly the growing children, to have sound, healthy bodies.

QUESTIONS

1. How can we keep our bodies sound?
2. What was done to repair the bodies of young men so that they could be soldiers?
3. How did the life at camp cause them to profit quickly from the medical care given them?
4. What is done at children's clinics?
5. Tell of your experience at such a clinic.
6. What is done at clinics for babies?
7. Do you know of any babies that are taken to clinics? What care is advised for the baby?
8. What are children's clinics for?
9. Tell of a health center in your community, if there is such.
10. If you have a school nurse, tell how her work is like that at a health center.

III. FEEDING OUR BODIES

Foods help us to have sound bodies. Our bones must have the right foods or they do not grow well. Our muscles need proper foods. So do the nerves and brain. The body liquids which help the organs of the body to function, need the right substances.

To keep our bodies warm and give us energy we should have such food as:

Bread and butter,
Oatmeal,
Potatoes and rice.

To build them we should have:

Plenty of milk,
Some eggs,
A little lean meat,
Leafy vegetables.

To give them certain substances they need we should have:

Milk,
Fruits, as prunes, oranges, apples, and pineapple,
Vegetables, as onions, lettuce, celery, turnips, and spinach.

From these different foods we build our bodies, and keep them warm and able to do their work. The foods give them small quantities of lime, salts, iron, and other minerals. These help make our bones. The muscles

use a little of these minerals too. Almost all parts of the body use some of all the different foods.

We do not need many kinds of foods, but we should have those we do need regularly. Everything that grows should have its own kind of food. Plants should have their foods, animals theirs, and people should have all of the different foods their bodies need.

Some people have become diseased from living on white bread or macaroni, without other food; others have become diseased from eating only polished rice, and others from living on corn bread and syrup without milk or eggs and other fresh foods. To grow well and keep our bodies sound we should have several different kinds of foods.

While we should take care to feed our bodies wisely, we should not expect this to take the place of sleep, rest, and exercise. It is by proper foods and other good care, that we make our bodies as good as they can be.

SUPPLEMENTARY READING

An Experiment in Feeding Potato Plants

The picture on page 13 shows three piles of potatoes and the potato patch in which they grew. The three piles might have been of equal size. They came from an equal number of hills. They grew in the same field. The plants were cared for (all over the field) in the same way. But they did not have the same foods.

In the part of the field where the middle pile of potatoes grew no food for the potato plant was added to the soil. The plants grew and produced their potatoes on what food the soil already had, but it lacked one food that potato plants need. Men from

the U. S. Department of Agriculture who make it their business to study the plant foods in soil had found that it lacked the nitrogen needed for producing a good yield of potatoes. So the best potato crop did not grow in this part of the field.



THESE THREE PILES OF POTATOES REPRESENT PLANTS
DIFFERENTLY FED

In one part of the field the proper amount of nitrogen was put into the soil. That is where the very large pile of potatoes grew.

The experts in soil foods wanted to find out how many potatoes would grow if they used a food other than the nitrogen which they had found the soil lacked. So in one part of the field they put food into the soil that the potato plants did not need. It did not take the place of the nitrogen that they did need. The little pile of potatoes grew in that part of the field.

The largest pile of potatoes grew where the soil had all the foods that potato plants need to produce well. The middle-sized pile grew where one essential food — nitrogen — was lacking. The

smallest pile grew where the soil was given the wrong food instead of the needed nitrogen.

Gains in Weight made by Some Underweight Children¹

The writer saw a group of ten or twelve children on a Saturday morning of a bright winter day in the lecture room of the Chicago Art Institute. They did not weigh nearly so much as children of their age and height usually do. But on this Saturday they met together because during the week each one had tried to gain all the weight he could. Not one of the group had gained less than two pounds. The doctor, who was also present, was a specialist on the nutrition of children. He was surprised at such large gains, for ten ounces in a month is a good increase for children 10 to 13 years old — which were the ages of most of the group. Yet the least gain made was at the rate of 136 ounces a month.

What had these underweight children done to make this unusual record? They had simply tried to see how much they could gain. They had tried to make the best record they could, just as a strong boy or girl tries to make a good record in running a race.

Some time before, they had learned, through talking with the specialist, what mistakes they were making. One of them was nervous and rested very little; another slept little; the oldest boy, who was not the biggest boy, stayed up late at night and skipped meals several times a week; one went to bed in a noisy room and did not go to sleep for a long while; another did not eat enough food and did not take time to eat properly. So it was with each: their way of living was not the most healthful. None of them had badly decayed teeth or poor sight or other parts of their bodies diseased or broken.

The specialist had been sent to the school. The children had listened to him. They wanted to see if they could gain in weight.

¹The incident told here came from health work carried on through the Elizabeth McCormack Memorial, Chicago, Illinois.

Their parents and teachers became interested too. So when the children began to gain in weight, they were encouraged at home and school.

This is what a ten-year-old girl did: She went home from school each day an hour before noon. She rested in a quiet room. Her mother prepared for her a good hot lunch. She took time to enjoy the meal. In the middle of the afternoon she drank a cup of warm milk. She made it her business all during the week to live as a happy, healthy child should live, and by doing so she gained more weight than she had gained in several weeks before.

The oldest boy, who was fifteen years old, but no larger than many boys at twelve, proved one of the most capable at the week's task. He went to bed early, ate regularly, and selected his food wisely. His gain was four pounds.

Some of the children had not needed to change their foods or eating habits so much. They played and rested as they should, and were hungry at meal time, as they naturally should be. They had a good time all the week. It was like a game. They were glad to show their records on the Saturday morning. They exhibited them just as boys exhibit their prize ears of corn at a farm crop exhibit.

Will they keep gaining weight so fast? No, when they have made up what they had neglected to gain before, they will go on growing naturally as children do.

QUESTIONS

1. Name foods that keep us warm and give us energy to do things.
2. Name those that give minerals for the bones, muscles, and other parts.
3. Name those that furnish bulk.
4. What ones are important in building our bodies?
5. Why should we eat of all the different foods regularly?

What happens from living on foods such as macaroni, rice, cornmeal and syrup? Name foods to use with any one of these foods.

6. Tell why the piles of potatoes were of different size. How many kinds of food did the middle-sized pile lack?

7. Have you seen a farm animal properly cared for and fed? Tell how different this animal looked than one not properly cared for.

8. Children 10 to 15 years of age do not usually gain over 12 ounces a month. How was it that the children described above gained so much? Would they keep gaining like that week after week? Explain. When would they gain gradually as it is natural to do? What changes in eating did the girl make? What else besides foods are important in increasing weight?

9. Why should a boy or girl not weigh too much?

10. If a child is not growing as well as he should because of adenoid growths or bad teeth, what is the best thing to do?

IV. WHY WE COOK FOODS

We cook most of our foods. We make them taste better by cooking them. We also make them easier to digest.

In the walls that line the stomach and intestines are little glands that give out digestive juices. These juices mix with the foods we eat and get them ready for the blood. They do not mix well with foods that are in big hard pieces or with raw foods, such as uncooked flour, potatoes, and oatmeal. They mix well with foods that are well cooked. Also there are more of these juices when the foods we eat taste good to us. Thus, we see that we feed our bodies better by cooking our foods well.

We should make our foods taste as well as we can. We should cook meats and vegetables to get the best flavors they have in them. We should mix foods together and season them to make them taste better. We should have, for cooking, foods that are fresh or that have been properly kept and have not lost their flavors. We should not cook spoiled foods or put a lot of spices in the foods we cook. We should get the flavors in the foods themselves. We should take care to prepare our foods so we will like them. When we enjoy the taste of our food, it digests much better and does us more good.

In cooking foods, we should not lose or destroy parts in them that our bodies need. Over-cooking very often

destroys the life-giving qualities. While it is important that some foods should be well cooked, it is also important to eat each day some raw foods, such as milk, ripe fruits and green vegetables. We should not lose the juices of vegetables in cooking them. If we boil potatoes and throw away the water, we lose the best part.

Toast, soft-boiled eggs, stewed fruits and vegetables, broths, and custard are among the cooked foods that are most easily digested. But meats that have been roasted slowly, and bread and oatmeal that are well done, are also easily digested. Fried foods and rich pastries are usually hard to digest.

We chew foods better if they taste well. Then we taste them more, and we do not have to eat so much to satisfy our appetites.

It is very important to us that we feed our bodies as well as we can. It is very important that we cook our foods properly.

SUPPLEMENTARY READING

The Sense of Taste in Insects and Other Animals

In wild life creatures usually accept their foods as they are found without special preparation. But they have a sense of taste, and this is often very keen.

A keeper in a large zoölogical park says that animals fed for a time on the cold storage meats are quick to notice the change when given fresh meats.

Ants soon leave alone honey with strychnine in it.

Flies select foods, though their taste is probably a part of their sense of smell.

QUESTIONS

1. Name two foods that should be cooked and tell why.
2. Why should we make food taste as well as we can? How can we do this?
3. How are foods that our bodies need sometimes lost in the cooking?
4. What care should be taken in cooking meats? Vegetables? Bread? Oatmeal?
5. Name cooked foods that are easily digested. Some that are hard to digest. Some that do not agree with you if eaten too often.
6. Why is it a misfortune for a growing child to be unable to drink milk? How should milk be used for such a child?



Courtesy of U. S. Department of Agriculture
4-H CLUB MEMBERS OF ALLEGHENY COUNTY, MARYLAND,
THEIR LEADERS AND PRODUCTS

V. CHOOSING AND CARING FOR FOOD

Some of us live in the city and buy our food from the market. Some of us live on farms and grow many of our foods. Some buy milk, and others have cows that furnish them with milk.

Milk and good vegetables are so important to all of us that we should take care to have them all the year.

In some parts of our country people have a disease called pellagra. It is not considered a contagious disease. It probably comes from doing for a long time without certain foods. If people always had milk and fresh vegetables, there would likely be no pellagra. Milk and vegetables are simple foods, but they are what we need to add to the other foods we eat.

It is important that the milk we have should be good. It should be clean and free from disease germs. It should come from a dairy that has a permit under law to sell dairy products. When it is marked "pasteurized," that means usually that there is no danger of disease being spread by it. If our milk comes from our own cows, we should be just as careful to have it clean and safe.

Let us find out what our city laws are regarding the production and sale of milk!¹

¹Write requesting your city or state health department to send you a copy of the law or tell you what it is or where you can get it.

We should have fresh vegetables that are wholesome and good during the garden season. We should have canned, dried, or stored fruit and vegetables at other times.

Boys and girls should help grow gardens when they can. This is one way they may help to feed themselves properly.



Courtesy U. S. Dept. of Agriculture

CLEAN MILKING

They should can and dry vegetables that they may have them for winter. They should take care that the vegetables and milk brought into the house are kept in a cool clean place. These simple foods are so important that boys and girls should do what they can to have them all the year around.

SOME IMPORTANT FACTS ABOUT MILK

1. Milk has all the different kinds of foods a baby needs to grow and keep well. It is a very important food for all children. It is a good food for every one.
2. Good milk is clean milk. A clean cow stable and



Courtesy U. S. Dept. of Agriculture

A MILK HOUSE

clean milk utensils are needed to produce clean milk. A milkman who is himself clean is necessary too.

3. Good milk is safe milk. It does not spread disease germs. Flies have been kept away. It has not come from tuberculous cows.

4. Pasteurizing milk makes it safe. In pasteurizing milk it is heated, and this kills disease germs, if any have reached the milk.

5. Good dishes of food are made from milk — custards, soups, ice cream, chocolate pudding, cottage cheese, salads.

SUPPLEMENTARY READING

American Boys and Girls as Gardeners

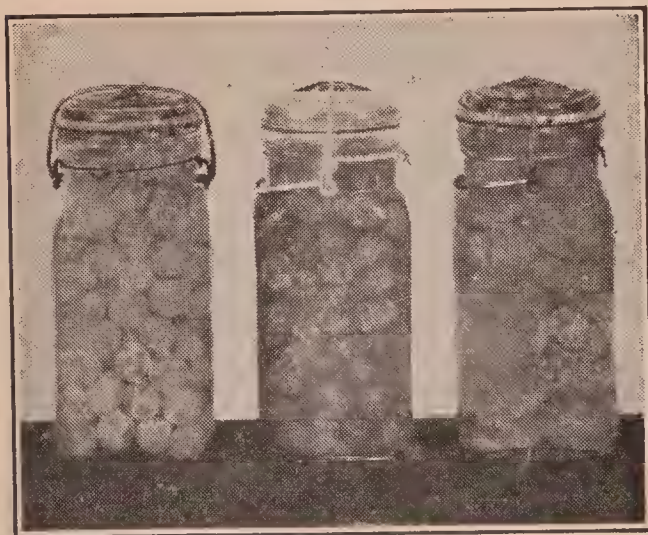
Boys and girls have been gardeners since gardens were made. They have always helped to grow vegetables and fruits and to dry



CHILDREN AT WORK IN A SCHOOL GARDEN, PASADENA, CAL.

and can them. More than 600,000 boys and girls living in rural counties scattered all over the United States belong to 4-H clubs. If you are a farm boy or girl and do not know about these clubs, write your State Agricultural College or the U. S. Department of Agriculture for information. Congress has appropriated money in order that all young people of the farms may join these clubs and have a leader to assist them in gardening, poultry raising, stock raising, dairying, canning and drying fruits and vegetables, or in any farm or home project a boy or girl wishes to undertake. Members of these clubs

are among the best gardeners and fruit producers in the nation. They provide good food for themselves, their families, and sometimes their communities. They play and work together. They make profits which they use for their own education or other good



FRUITS CANNED BY GIRLS

purposes. But no work they do is more important than gardening, dairying, and canning fruits and vegetables.

Boys and girls who are not members of clubs grow gardens and save the foods. In America gardening and canning foods are among the industries of the children. They make money for themselves, and they help supply

the nation's food. The exercise in gardening makes them grow. The foods nourish their bodies.

Interesting Observations on How Food is Secured among Wild Life

Woodpeckers stick acorns into the holes they have made in tree trunks, and later eat them. Squirrels store nuts. The industry of ants in providing food for themselves has excited great wonder for ages. The honey-bee is known as "the busy little bee," and most of its effort is to make bee-bread and honey.

Some creatures like the frog sleep during the winter and do not eat.

Most birds select certain foods. Some live chiefly on seeds, buds, and berries. Others eat certain worms and insects. The swallow secures its food from the insects it finds while in flight and teaches its young to do the same thing. The common black crow will eat almost anything.

Everywhere the wild life seeks for places where food is plentiful. Even so, the struggle to keep hunger satisfied is usually a very hard one. Beasts in captivity generally have a longer life than they would have otherwise, because they do not need to struggle to secure food, or to escape their enemies.



THIS RAT HAD NO MILK

THIS RAT HAD MILK

These two rats are the same age and they were the same size when their reeding test began. Then they had the same kind and quantity of food except that one had milk and the other had none. Photos by courtesy Dairy Division, Bureau of Animal Industry, U. S. Dept. of Agriculture.

QUESTIONS

1. What foods should we take care to have all the year?
2. What is pellagra? What probably causes it?
3. Name vegetables other than potatoes that grow in a garden.
4. Which of these may be stored for winter's use? Which should be canned or dried?
5. Is milk an easy food to produce and keep clean and cool? Explain.
6. What are some regulations of your state that have to do with producing clean milk?
7. What are some regulations for marketing milk?
8. Read in the Appendix of this book how milk is pasteurized.
9. Why is care taken to keep the temperature below the boiling point in pasteurizing it?
10. Why is it important for boys and girls to be gardeners?

VI. EXERCISE FOR GROWING BOYS AND GIRLS

Our bodies have many muscles. They have several hundred of them. These muscles hunger for exercise as our stomachs hunger for food. Both the big muscles and the little muscles hunger for it. They want to stretch. They want to pull. They can do so. They are fastened to the bony frame.

When we walk and climb and leap, the muscles pull and stretch. When we swim and throw and bat a ball, our muscles pull and stretch. This makes them grow strong and big. The more they do the more they want to do. They keep growing stronger and bigger.

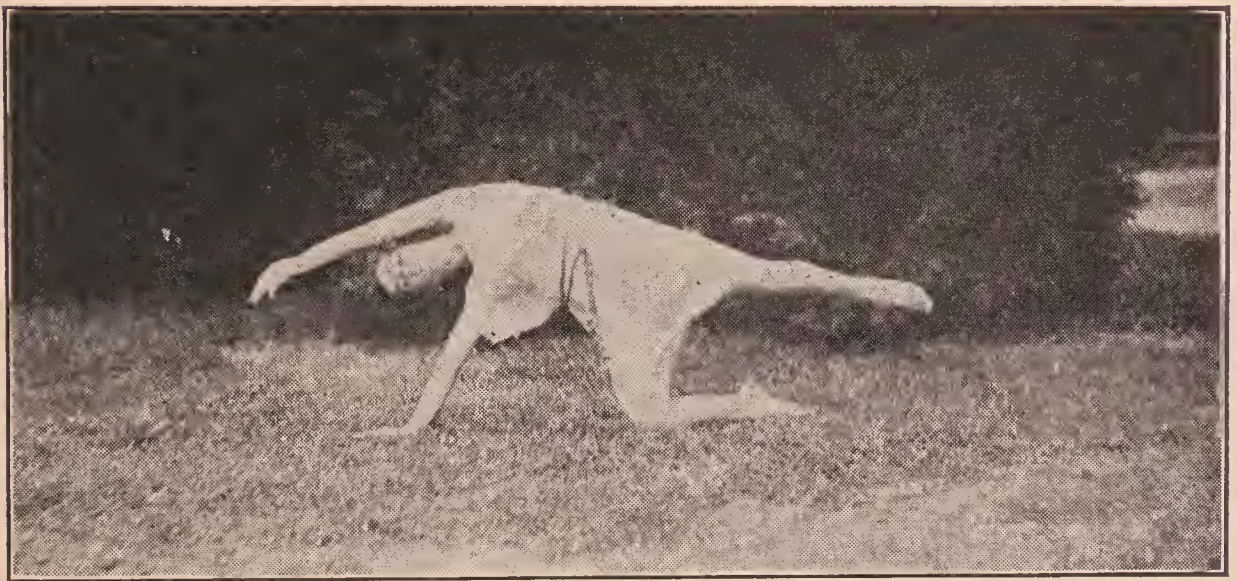
When we use our muscles, we exercise our heart and lungs as well, for the one must pump more blood and the other breathe more air. If we did not exercise them in this way, we would soon be so we could not run or even walk any distance without being out of breath. We know many people who cannot run fifteen yards without panting for breath, while others can do cross-country running for several miles.

Thousands of people can use their bodies at work all day long, and yet, even when rested, are unable to run without being out of breath in two or three minutes. For them climbing or swimming or playing ball games is out of the question. It is not natural for our bodies to be unable to run or play games. If we keep doing these

things we shall always be able to do them. Our heart and lungs and our whole body will be better.

Can you balance your body in almost any position? Do you use all parts freely? Do you use your trunk and legs properly when you walk or run?

Can you walk a mile in twenty minutes? What are



AN ALL-THE-WAY-THROUGH STRETCH

your strong points in walking and running? Your weak ones? Can you illustrate with your body the rhyme —

In a free body energy flows
From finger tips to toes.

Note what a perfect illustration of it the picture gives.

We should not have stiff bodies while we are growing and they should not be too stiff after we are grown.

Growing boys and girls should have at least two hours of good outdoor exercise every day. This is the way to have strong muscles and a good heart and lungs.

HELPS FOR HEALTHFUL EXERCISE

Do not overexercise. Do not play or tramp in the woods when too tired and hungry.

Remember that you do your body as much good when you run as fast as you can as the boy does who can run twice as fast. Enjoy what you can do. In the long run



Wide World Photos

AN EXPERT SWIMMER MAKING A DIVE

the winner is the one who keeps steadily doing his best. This is true, because you do not learn to do things at once and because you grow strong gradually.

There are three classes of boy scouts and three classes of girl scouts in order that boys and girls may have time to gain strength and to learn to do things before they are promoted to the highest class. It takes time for your body to grow. It takes time to gain strength.

If you are sleepy after your noon lunch, try to take a short nap. You will play better and feel better the rest of the day.

SUPPLEMENTARY READING

Interesting Facts about Exercise of Creatures in Nature

A fox runs naturally twenty-six miles an hour, and he can keep it up for several hours. The prong-horned antelope is speedier still, and can keep going so long it is almost unbelievable. Its speed equals a fast express train.

Birds make long migrations without rest. The plovers in migrating southward to the Bahama Islands from Canada, a distance of some 2,500 miles, are supposed to remain on the wing and make of it a continuous journey.

Many creatures of the wild have marvelous endurance. Unless hunted or otherwise pressed, they do not usually overtax their strength in their activities. Some birds are very fatigued after a long flight, but how they make the long journeys at all is a puzzle that one can think about a long time without being able to explain.

Very old animals living in captivity keep in condition as long as they exercise. When they stop, they frequently grow fat and soon die.

QUESTIONS

1. About how many minutes a day do you spend in walking, running, playing a game, or other such exercise?
2. If you should lie down all the day except when doing things that exercise your whole body, how much exercise of this kind would you need?
3. What does exercise do for our muscles? If we let them become used to having little exercise, how have we harmed them?
4. How do we exercise our heart and lungs? Why is it important that we exercise them?

5. When people no longer run, or in other ways exercise their whole bodies, what is the usual result?

6. Why does exercise do less for us if we have let our bodies become crooked?

7. What should we expect good daily exercise to do for our bodies?

8. If our exercise has been good while we are growing, how well should we be able to use our bodies?

9. Why should you not try to make your exercise exactly like some one else's?

VII. OUR BODY SKELETON: HOW FREELY WE CAN MOVE IT

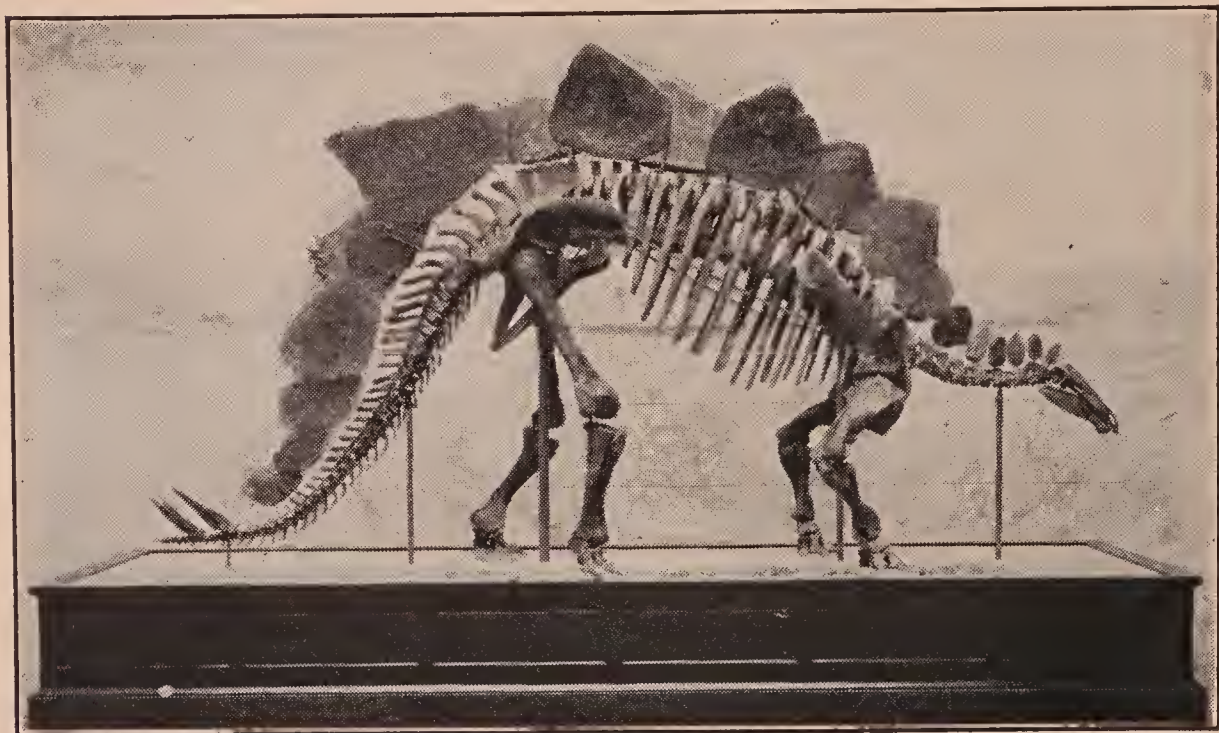
Our skeleton is on the inside of our bodies. We have a backbone or spine. Animals with backbones are called vertebrates. We are vertebrates. So are fishes and birds and the larger animals. We have more freedom than creatures that have shells on the outside of their bodies.



A BALANCING POSITION

Muscles grow on the skeleton. The backbone is flexible and gives us great freedom of movement. We, like most vertebrates, can move from place to place rapidly and protect ourselves from danger. We have many powers because our skeleton is inside our bodies and made so as to allow free motion.

We can stand erect. Only a few animals can stand so for even a few minutes at a time. We can bend our backbones forward, backward, and sideways.¹ Each bone of the spine is free from the one below and above it, and there are cushion pads of cartilage between each pair.



Courtesy of the Smithsonian Institution

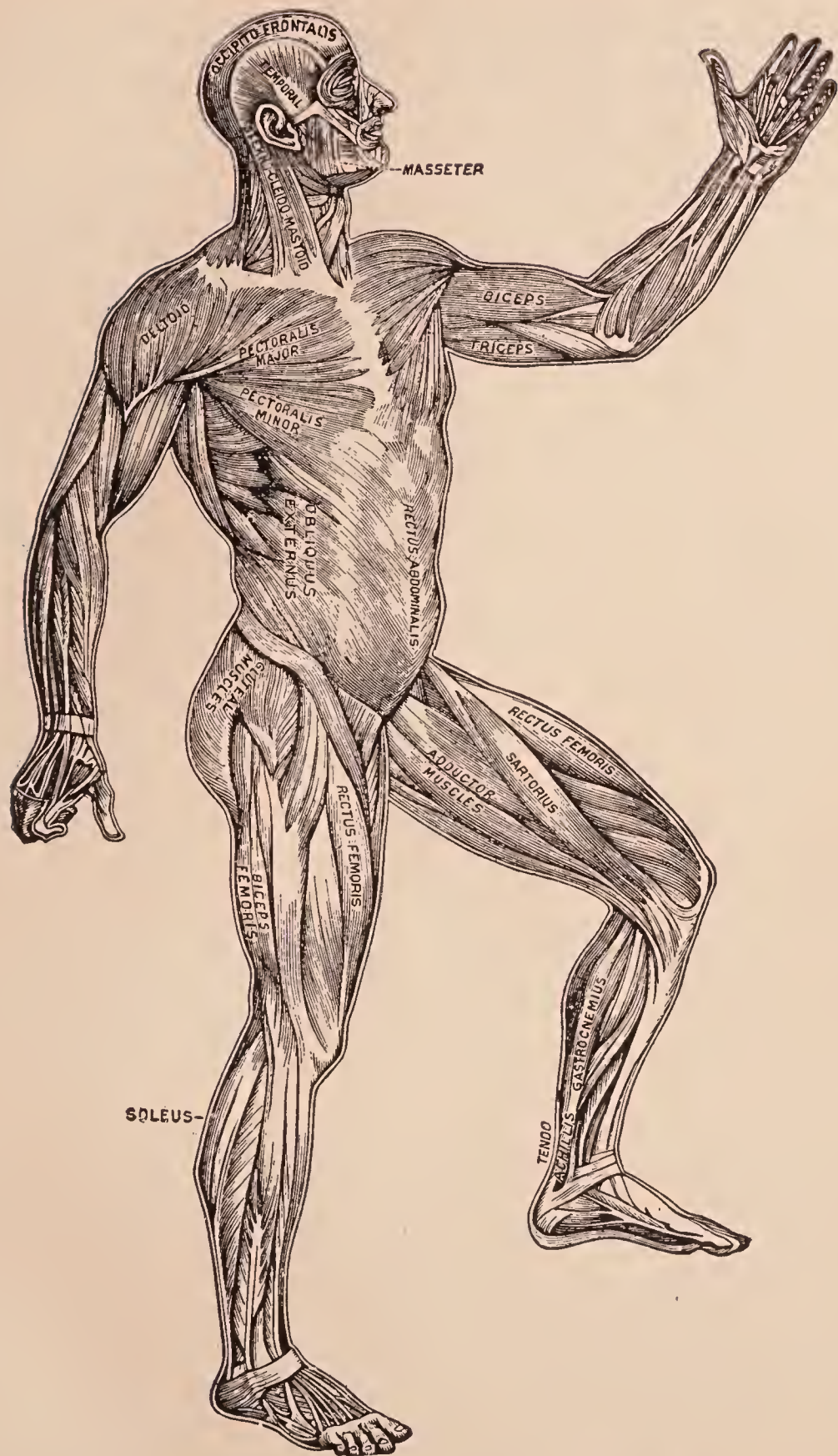
SKELETON OF DINOSAUR IN THE NATIONAL MUSEUM AT
WASHINGTON

This lets us have motion throughout the whole spine. It gives it a springiness which saves us from jolts and jars.

It is by our backbone that we keep the body balanced. It has curves. The upper part of it supports the neck and head. The lower part holds the legs vertically from the ankles. The shoulder is in the same vertical line.² This

¹ See illustrations — Exercises for the Spinal Column — in the Appendix of this book.

² See illustration, Lesson X, of this book, page 54.



MUSCLES SHOWING HOW ARMS, LEGS, HEAD, AND TRUNK
ARE UNITED

is the standing balance. When we jump we fold our body, but when we land we spring to the standing balance again.

Our spine lets us have united movement of our whole body. That is how our whole body jumps and walks and leaps. Some people when they walk do not have free motion all the way through from head to legs. They stop the motion before it goes through the upper spine and so do not carry their heads naturally. Or they let the legs move as if they were pegged in, and the spine is hardly exercised at all. But the wonder of our body frame is in the way motion may go all the way through it. We can keep our balance and run freely as four-footed animals do. The spine is a wonderful part of our body frame.

We also have freedom in the way the ribs are fastened. The trunk muscles allow free motion too. We can bend the trunk about itself as a flower sways around its stem. The trunk bends forward and back and to the sides. Its muscles are not stiff by nature. The trunk helps the spine to give us free motion. It also helps in making the whole body move together.

Muscles from the legs and arms fasten in the trunk. We need never use the arms and legs as pegs. We need never walk so that the movement is not united from trunk to head and trunk to limbs. When we stretch and try to loosen up our bodies, we should stretch the trunk and not just the arms and legs. We should keep the trunk exercised so it can be moved in many directions. We should balance our bodies in many different positions.

Our body frame is more wonderful than we know. Let us learn to feel this wonder and use our bodies in free motion. The sculptor knows its wonder. He shows balance and unity. We can show this in standing and walking, and in all the ways we use our bodies. Nature has made our bodies so we can keep them free. Let us keep them so.

SUPPLEMENTARY READING

Interesting Facts about the Movements of Animals

The larger species of the kangaroo makes twenty feet and sometimes more at a leap. Almost any kangaroo can leap nine feet. When going at its best, leap follows leap and only its hind feet touch the ground. The fore legs are held close to its chest, and its tail is straight back. Its tail helps it to keep its balance.

The flying squirrel does not really fly; it glides downward. On each side of its body, stretching from front legs to hind legs, is a fold of skin. When it glides, this stretches out and balances it.

The bat has perfect flight. Its wings are not like a bird's. There are bones corresponding to those of an upper and lower arm and of fingers. These are exceedingly long. Between these is a thin, strong membrane.

Most vertebrate animals have speed. The large sea lion dashes rapidly through the water, or loops, turning itself through long curves as an airplane may do. Some deer run so swiftly their feet can hardly be seen. These and many other vertebrate animals protect themselves against enemies by their quickness of movement.

On page 32 is an illustration of the skeleton of a dinosaur of the ornamented kind. This animal could not readily flee or fight or search for food. It was a vertebrate animal, but not able to protect itself well. It and its kind are now extinct.

Some Facts About the Movements of Boys and Girls

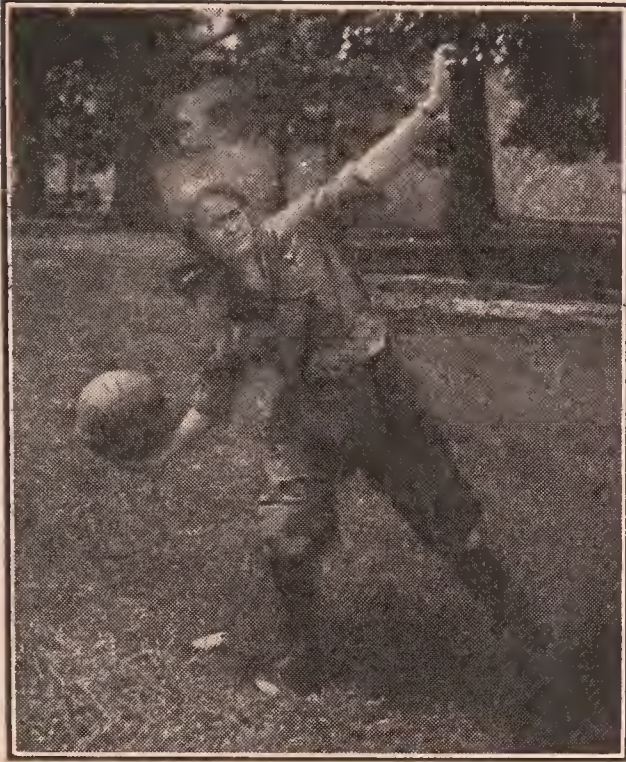
THE BOY — RUNNING

The boy — to make the picture definite — the twelve or thirteen-year-old boy — sometimes covers fifteen feet in a second in running. His body is tall as he runs. It makes a tall line, with one leg forward, and then a tall line with the other leg forward. The stride is as long as it can be and let the body keep erect and in good balance. Just the moment the body is balanced with one leg forward, the other leg springs forward and the same thing happens again. The legs and arms move straight forward and back, and the head is up, in line with the rest of the body. He uses his whole body and runs as perfectly as animals do.

Sometimes the boy is not quite ready to run. He then makes ready. He takes a good position, stamps the ground rapidly and lets his arms feel free. Then he is off, and after a few yards he is going as fast as his legs can carry him. No animal can keep its body in a vertical position and balance itself at high speed running as a boy can.

THE GIRL — THROWING

The girl — to make the picture definite, the twelve or thirteen-year-old girl — can throw a basket ball forty or more feet. In preparing to throw it, she takes a position that she could not take if it were not possible to balance her body in different ways or to bend her trunk freely. The right leg is forward, foot pointing forward; but the left leg with foot turned outward to the side and knee bent in the same direction supports the weight. The trunk is turned to the side, and bends so that it is easy for the ball to be held in the curving forearm. Thus the girl stands. She is looking toward the goal, and her other arm is stretched in an outward and upward direction. This helps her to keep her balance. Then with a flash she swings round, her weight is held over the toe of the left foot, and as she swings she slings the ball



First Position



After the Throw

PUTTING THE BALL

upward and on. Immediately she rests her weight on the whole left foot with the left knee bent. One arm is stretched in the direction in which the ball went.

The girl uses her whole body in making the throw as perfectly as the squirrel uses his body in jumping from limb to limb.

THE GIRL — SITTING

The girl sitting may be any girl. She sits in a chair. Her feet rest easily on the floor. Her long back rests against the back of the chair. Her trunk and head are in line just as when she is standing. They let her feel tall in the same way. Some one enters the room, and then she stands easily. She does not awkwardly get up, one part of her body moving and then another, but she just stands. Then she sits easily in the same way. A book has fallen to the floor at her side. She does not move her feet or bend forward, or use both arms to pick it up. But she reaches one arm down, bending the side trunk and head with it. She picks up

the book and returns to position. She reads the book sitting as perfectly as the bird sits on the limb of a tree.

THE BOY — JUMPING

The boy — to make the image of him definite — is between 50 and 54 inches tall and weighs between 70 and 85 pounds. He can jump four and a half to five feet.

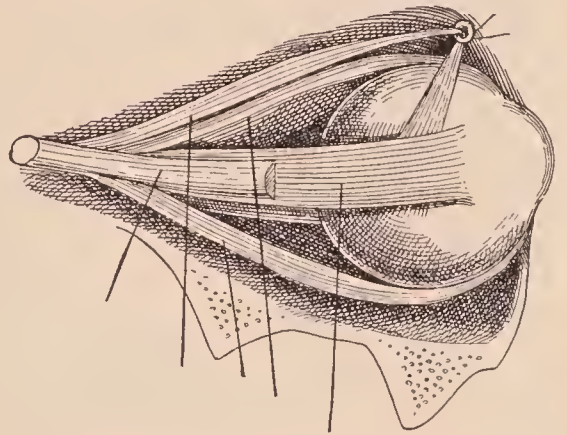
Before he jumps he stands on edge of the jumping pit, his feet wide apart. He stretches his body tall and his arms come up too. His arms sweep down and back, at the same time his body leans forward, knees slightly bent. Knees then quickly straighten, body still leaning forward, and just at the moment that it seems he cannot keep his balance any longer, he springs. To make the jump high, he straightens his legs backward and immediately flings his heels upward. Then he brings his legs forward and his arms forward, and lands with his knees bent, his arms reaching forward, his trunk nearly vertical. Like the kangaroo, his whole body jumps, and yet he keeps his balance.

QUESTIONS

1. Why can we stand erect and still place our bodies in so many different positions?
2. Why should we in walking use our whole body and make a united movement?
3. What mistake do we often make because our arms and legs are so free?
4. Why do animals move in one free bound or leap so much better than we do? Is this difference natural or should we too leap and run, using our bodies as animals use theirs?
5. Can we have free bodies if our trunks are stiff and unable to bend in one direction and another? Show one thing you can do because your trunk is not stiff.
6. Make use of games and exercises given in the Appendix of this book.

VIII. OUR EYES AND THEIR CARE

The eye is a busy little machine and at the same time a window. An eye does not look like a window, but as we see things it seems like one to us. Just inside the part we see is a clear curved structure that is like a window. It is the lens. It corresponds to the lens of a camera. It is because this lens is all the time changing its shape that our eyes are so busy. It sometimes flattens or bulges out more than nine hundred times a minute. Small eye muscles control it. Larger pairs of muscles let our eyeballs move just so far to the right or left or up or down.



MUSCLES OF THE EYE

When our eyes are perfect, with no parts out of repair, they do their work easily. When the eyeball is too long from front to back, the lens and its muscles are overworked in trying to bulge enough to make on the back of the eye a clear image of a far-away object. Again, an eyeball may be too short from front to back, and then the lens tries to flatten so there will be a clear image. There is also strain if the lens itself is not well-shaped. When anything is wrong with the parts of the eye, the eye-machine has too much to do.

We do not always know when the parts of our eyes are wrongly made. We do not even know many times when we do not see well. Our vision may be a third less than it should be without our knowing it. But we can find how well we see by having our eyes tested. We can have this done at school, if there is an eye test chart and a light room to take the test in.

It is very important that we find how well we see; if we do not see well, we should correct the fault, if that is possible. We can enjoy ourselves better and do things more easily if we see well, also our eyes last longer. It injures them to try to use them when something is wrong. We may need glasses. We can not usually tell whether we do or not until an eye doctor examines them. He finds why we cannot see as we should. Our teacher can not find this out in giving us the eye test. She only finds how well we see. Some of us frequently have headaches, and our eyes pain us. Then we should see an eye doctor, whether we have taken the eye test or not.

We should rest our eyes. All the time we are using them little nerves that run all through a covering over the hidden part of our eye balls are carrying messages of the light to the big optic nerve at the back. This in turn carries the messages to the brain. These nerves tire. If the light is too bright or if it is shadowy and uneven, or too dim, the nerves and all parts of the eye tire more easily. This finally harms the eye. Our eyes should have good light to work in and we should rest them.

To have good daylight, windows should in most rooms

be on one side, high toward the ceiling, and without shades, except white ones to use against direct sunlight. There should be window space equal to about one fourth of the floor space. The upper walls and ceiling of the room should be a light color to throw the light out into the room. We take care of our eyes when we use them in a properly lighted room.

Our eyes may be harmed by contagious diseases. We should use no public towels, or get germs in them from our hands. We should use a fresh clean cloth to wash them.

We should avoid accidents by being careful how we use sharp tools. We should learn how to remove a cinder. Good eyes are worth much to us. They make us glad to live. They let us use our strong bodies. They give them good windows. We want our bodies to have good windows. We want to see well for many, many years.

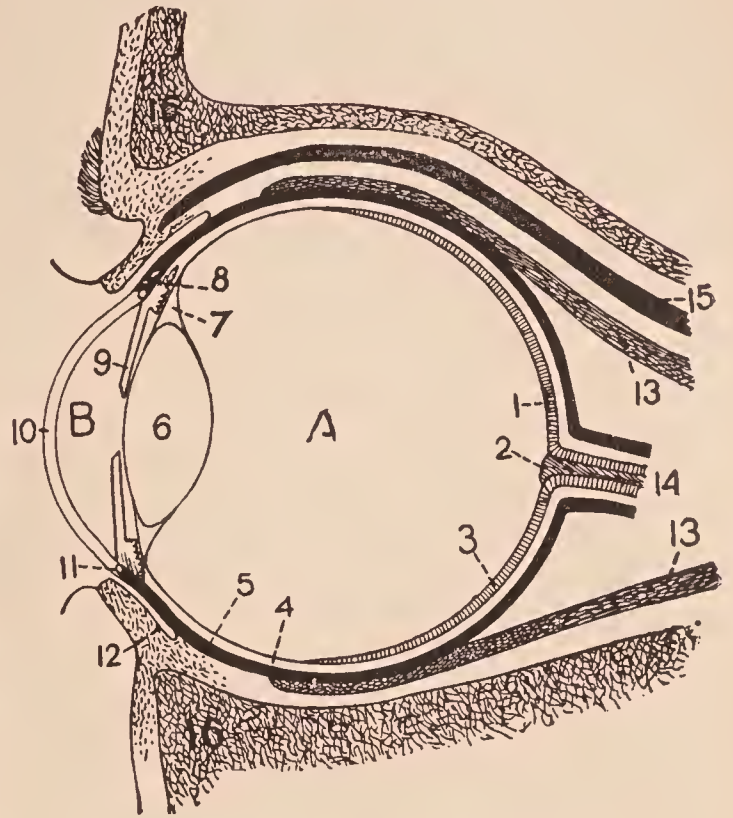


DIAGRAM OF THE EYEBALL

1. Yellow spot. 2. Blind spot. 3. Retina.
4. Choroid coat. 5. Sclerotic coat. 6. Crystalline lens. 7. Suspensory ligament. 8. Ciliary processes and ciliary muscle. 9. Iris containing the pupil. 10. Cornea. 11. Lymph duct. 12. Conjunctiva. 13. Inferior and superior recti muscles. 14. Optic nerve. 15. Elevator muscle of eyelid.

SUPPLEMENTARY READING

Interesting Facts about the Eyes of Creatures in Nature

Insects have simple or compound eyes or both. The honey-bee and the housefly have both. There are usually three simple eyes arranged like a triangle near the top of the head of insects that have simple eyes. The compound eyes are paired and are on the sides or top of the head. The compound eye is made of tiny window-like surfaces. Sometimes there are several thousands of these in one eye. Behind each are a lens, coloring matter, and a special nerve. The lens cannot flatten or bulge. The range of vision of the honey-bee is probably two or three yards.

An insect probably sees little of the shape of anything, but it can detect motion better than many of the higher animals can.

Both a snail and the common crab have their eyes set on stalks extending out from their bodies.

The tadpole has two rings on its skin where eyes will appear. As it grows into a frog the skin covering disappears. The full grown frog has eyelids.

There is a gelatin-like mass around the eyeballs of fishes. Fish have no tear glands. The water they live in keeps sand and particles washed away.

Birds have a third eyelid. It is hidden in the front corner of the eye and will draw over the eye like a close-fitting shade.

Many of nature's creatures have very large eyes in proportion to the size of their heads.

Owls see well at night. So do some other animals.

A deer may look toward a man standing in plain view apparently without seeing him, but if there is a slight motion, it sees that.

Some animals have very beautiful eyes. The antelope is one of these. Its eyes glisten at night. The head keeper of a zoo now and then goes through the park at night holding a flashlight from the top of his head that he may see the animals' eyes. Some appear white and others glisten in many colors.

Why Thirteen Musicians Wear Glasses

In a certain orchestra are thirteen musicians and every one wears glasses. It always brings a smile from the audience when they first appear on the stage. "But who would like to read from sheet music afternoon and evening several times a week and not protect his eyes?" said one of the musicians when asked why they wore them. They see without glasses as well as many other people do. But they are not going to run any risks, and they wear just the kind they need. They want to play music and still be able to see well for years to come.

The Right Eye-glasses

It is a strange fact that many people cannot see well, and yet they do not know it. In one sense this is not strange, for if one has never seen well or has become used to poor vision, how can he know it?

Most people do not know when they have the proper eye glasses. They think that those that let them see as they have been seeing are best. Only a good eye doctor or a good oculist who can examine the eyes and tell what is wrong knows what glasses are the right ones.

How the Railroad Station at the Nation's Capital is Lighted at Night

The railroad station at the Nation's Capital has a large waiting-room. At night this room is lighted so well that one can read anywhere in it in comfort. Yet there is not a light to be seen. A balcony runs entirely around it. From this balcony one can look down into the waiting-room and also up to the high ceiling and upper walls. Along the sides of this balcony is a trough made of the same white stone as the rest of the room and running all the way around. In this trough is a row of electric lights. At night these light the high walls and ceiling, which throw the light back into the room, making it evenly lighted throughout. But no electric light can be seen.

Color Tints of Walls and Ceiling

The out-of-door daylight around us is not direct sunlight. It is sunlight that has been softened by the earth and the objects on the earth. If the earth were white and the objects upon it were all white, it would give us so much sunlight that we would not be able to see. The brown earth and the green upon it soften the sunlight for us. Indoors the walls and ceiling of a room change the daylight just as the earth and outdoor objects change it. But indoors we usually need more light rather than less. This is why the ceiling of a room should usually be white or very light. Then it throws the light that strikes it back into the room. Walls of soft tints of yellows, grays, and greens soften the light. Yellow tints are often best for north rooms. When the sunlight is bright outside a room, the tints of the walls inside should be a little darker. When there are shade trees that keep part of the sunlight away, the tints should be lighter.

The Lighting of a Classroom

On the opposite page is a drawing showing a floor plan of a classroom and how windows are arranged for lighting. The plan is made by Dr. Fletcher B. Dresslar, who has prepared government bulletins on school buildings and their construction. He has given many years to the study of the school house.

The long way of this classroom is east and west. It is for a location in the southern states. The windows are on one side only — the east. The room is bathed in sunlight in the early morning, and after ten o'clock there is no need for window shades for the rest of the day.

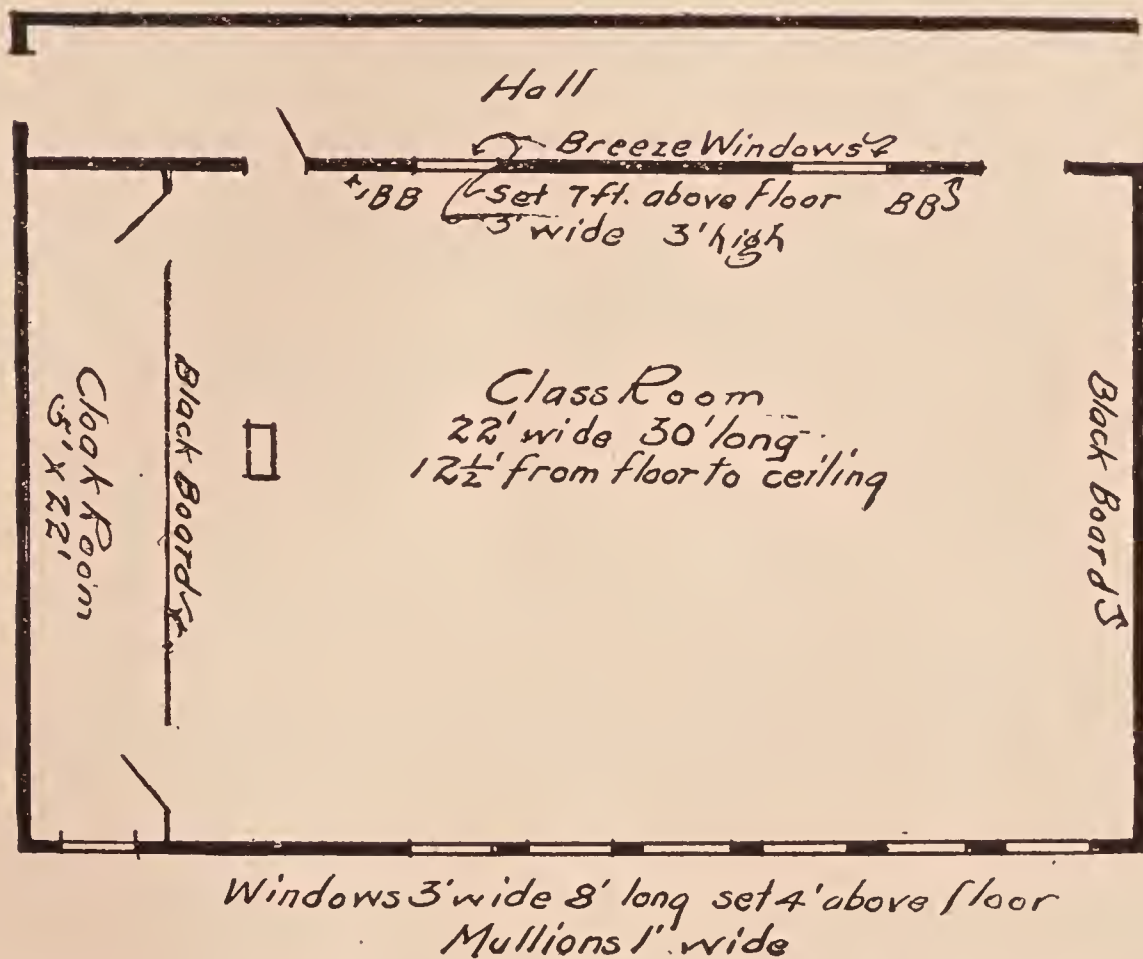
The windows are four feet above the floor and therefore above the level of the children's eyes as they sit at their work. It is very bad for windows to be below this level.

The windows make one fifth of the floor space. They are arranged so that a wide space is left toward the front without win-

dows. This keeps the children in the rear of the room from having too much light in front of them.

The windows reach to within six inches of the ceiling. It is good to have light from as high up in the room as possible.

Naturally the windows are placed the long way of the room.



PLAN OF A CLASSROOM SHOWING PROPER WINDOW SPACE

There can not only be more of them, but the light does not have to travel so far. It makes a difference how the room is placed — whether the long sides are to east and west or to the north and south. The room has better sun when the long side having the windows is on the east or west.

Breeze windows are placed high up on the wall opposite the light windows. There are two doors opening into the hallway which may be opened for ventilation also.

Dr. Dresslar would not tell you how to place windows in your school building, until he knew many facts about it. How does it face? In what latitude is it? Is it in a level, open country, or among hills, or among other buildings in a city? But in any classroom it is not good to have cross-lighting. It is well to have the windows reach well toward the ceiling.

QUESTIONS

1. How may we find out if our sight is not good?
2. What do eye lenses do?
3. What kind of light is bad for the eyes? What harm does it do? What kind of light is good?
4. How are the windows placed for proper lighting of a room?
5. Why are the tints of walls and ceiling important?
6. Is your school room well lighted? Explain. Is your seat properly placed?
7. How do we save our eyes from contagious diseases? If a contagious eye disease breaks out in your school, what care is taken to prevent its spread?
8. Why do the thirteen musicians of a certain orchestra wear glasses?
9. Why can people be easily fooled in being fitted with glasses? Why should the doctor who examines the eyes fit them with glasses?
10. Why are lights placed under or covered by bowls or lamp shades?
11. When a light is placed in a bowl that hangs from the ceiling, how is the room lighted by it?
12. Why would it be less pleasant if the bright electric lights in the large waiting-room of the railroad station at the National Capital were in full view?

IX. WE CAN HAVE SOUND TEETH

Our eyes are like machines with many little parts. But our teeth have only a few parts. If our teeth are sound and strong, we can use them all our lives without breaking them unless we crack nuts or bite something that is hard with them.

But many of us do have broken teeth. The reason is that we let them become unsound. We let holes come into them. Then they break.

If we let many holes come in them, our teeth break to pieces before we have lived half our lives. Besides, they ache and hurt.

Of course we do not want teeth that ache and hurt the first half of our lives and then have no teeth at all after that. But this is what often happens when they have holes in them.

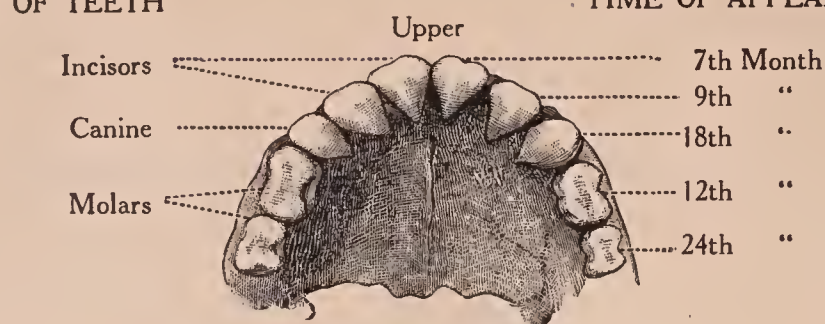
Holes come in our teeth because we leave little pieces of food in them to sour and spoil. The germs in these spoiled foods make holes.

We can help keep our teeth sound. We should clean our teeth and have a dentist fill any holes that come in them.

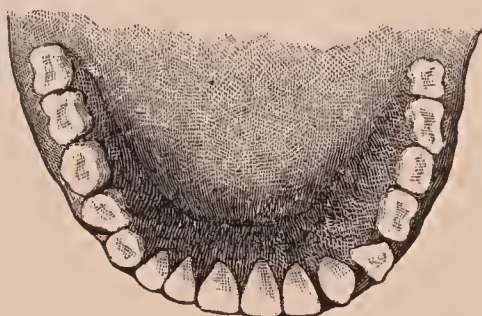
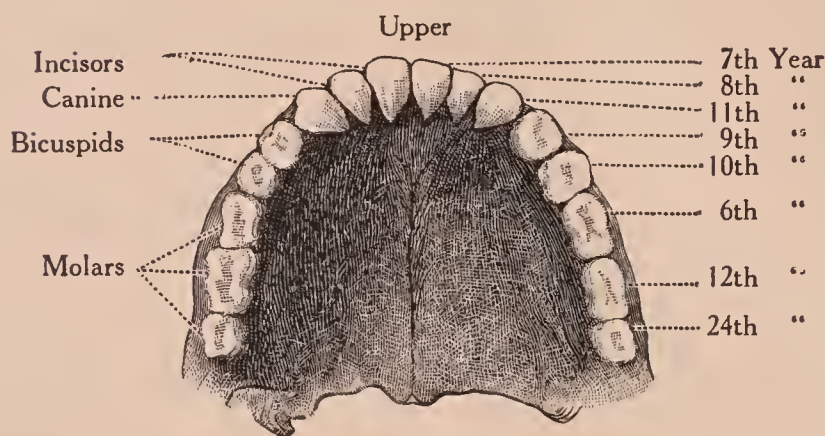
We should have a dentist fill a hole while it is small. Then we do not have toothache. Then we are not likely to have diseased teeth. Within six months a hole can come in a tooth and get large enough to hold a filling.

KINDS OF TEETH

TIME OF APPEARANCE



TEMPORARY SET



Lower

PERMANENT SET

TEETH: KINDS, ARRANGEMENT, AND TIME OF APPEARANCE

It is necessary to have our teeth examined often to see if any tiny holes have come.

When we brush our teeth carefully with a good tooth brush, we remove the little pieces of food. If they are crowded together we can not get all the food away with a brush.

When we clean them carefully and rinse our mouth we not only save our teeth but we have a clean mouth. Of course, we all like to have teeth and tongue and gums fresh and clean and healthy. We can have them so if we clean them well and rinse our mouths in clean warm water.

We may have teeth that are soft and not well formed; then we need all the more to care for them. If we have healthy teeth, our whole bodies are healthier. We can chew our foods better. Our teeth will not cause other parts of our bodies to become diseased. We do not want to live half our lives without good teeth. We can usually keep our teeth if we take care of them.

SUPPLEMENTARY READING

Dental Clinics

In Buffalo, New York, it is required that all new school buildings have a room for a dental clinic. In many places in the United States dental clinics for school children are located either in the schools or near them.

At the dental clinics for school children nurses usually examine the teeth and make drawings to show where fillings are needed. These drawings are given to the child to show his parents. At certain times the dentist of the clinic comes to fill the holes in the teeth. When a nurse examines a child's teeth, she not only finds the holes if any are there, but she advises the child about the best way to care for his teeth and mouth.

Good dental clinics aim to help children keep their teeth sound and their mouths clean and healthy. A child who has the use of a good dental clinic when he is growing up need have no big dental bills to pay later, nor should he have badly broken teeth.

Discovery Made through a Dental Clinic

The following story (true story) is from New York State: ¹

In one of the schools of our state there came under my observation a boy 12 years old whose baby teeth were still in position in his mouth. Usually at this age all of these deciduous, or temporary teeth, have been lost, being replaced by the larger permanent set. In this boy only the two upper front teeth (central incisors) had appeared. His jaws had not properly developed nor the baby teeth separated to make room for the wider, permanent ones. Radiographs were made of both upper and lower jaws, and to my great disappointment not another sign of a permanent tooth appeared. This meant that he must go through life with only his baby teeth, as he will never have the permanent set. Fortunately these teeth were of good structure and had withstood decay very well, although some cavities had recently developed. Of course, cavities in the baby teeth should always be filled, but see how much more necessary it was to do so for this boy, and for him to constantly watch them and give them the best of care. Both the boy and his parents were very grateful to the school dentist for observing the defect and warning them of its possible consequences.

QUESTIONS

1. Why do so many people have broken teeth?
2. What finally happens if nothing is done to rid our teeth from holes?
3. How do these holes come in the teeth?
4. How may we have sound teeth?
5. Why is it necessary to have a dentist examine them now and then?

¹ Dr. Stanleigh R. Meaker, Inspector of Mouth Hygiene for the Public Schools of New York State, wrote the story just as it is given here.

6. Do sound good teeth let us have better digestion? Give two reasons why.
7. How may poison from diseased teeth reach other parts of the body?
8. What is the proper way to care for the teeth?
9. What care should be taken in brushing the teeth? In keeping the brush clean?
10. Do you have the habit of cleaning your teeth twice a day? What is the reward for such a habit?
11. What do school children gain by having the service of good dental clinics?
12. When there are no dental clinics what other service should you seek?
13. Why is money saved by going to a dentist to have the teeth examined twice a year?
14. What unusual case was discovered in a dental clinic?



Courtesy of 4-H Clubs, U. S. Department of Agriculture
GOOD HEALTH MAKES FOR GOOD POSTURE

X. THE RIGHT WAY TO STAND

In Lessons VI and VII we learned how the skeleton and muscles of the human body are made to hold the body erect and still allow many kinds of movements. We have gone far enough in our health study to know that a straight body allows more freedom than a crooked body does. Also we must have discovered that our bodies are made to stand erect in a certain way. When we stand erect in just that certain way, we can walk and run and leap as easily as wild animals do. It is this that gives good balance and it is good balance that lets us stand erect.

When a baby is just learning to stand and walk, it must be ever so careful or it will lose its balance and fall. It might be a good thing if this condition remained all the time we are growing. Then we would not let our bones and muscles grow wrong.

But there is sometimes a real excuse for letting the body be stooped and crooked. Trunk muscles have to grow stronger all the time so they can hold our growing bodies erect. If for any reason they do not have this strength, we may not have erect bodies until the strength is gained. We should not forget this fact if our bodies are stooped. Under such a circumstance our first effort should be to make the muscles of the trunk strong. We should hold our bodies straight for a little while at a time. This exercises the trunk muscles and helps them to

become so. After a time we can keep our bodies straight all the while. By this practice we make them straight.

There are several ways of finding out whether we stand straight. The best way is the one we usually learn last — that is by how we feel. When we stand straight we feel



INCORRECT
POSTURE



CORRECT
POSTURE



EXAGGERATED
POSTURE

tall, as if the tops of our heads were held by a string. Our bodies do not feel stiff but ready to walk or run easily.

We can find if we are standing straight by trying to balance. When we are in good balance we should be able to stand on one foot and raise the other knee without falling over. Notice in the picture on page 55 that the girl holds her body easily on one foot while she folds her

trunk over the raised knee. If her body is quite poised, she can straighten her trunk very slowly and still not fall. We should try to do this until we have the feeling of good body poise.



JACK KNIFE FOLD — FORWARD



JACK KNIFE FOLD — BACK

A straight body is a flat body — that is, no part sticks out either in the front or back. The head is held high, the chin in, the legs make a vertical line from the ankles and the weight of the body is balanced over the balls of the feet.

SUPPLEMENTARY READING

Interesting Observations about how Birds and Other Animals Balance Themselves

When a bird flies it does not turn over forwards or sidewise. The way it holds its tail, wings, and head all help it to keep it in proper balance.

The giraffe must move its long neck backwards and forwards to keep its balance when running. It does not balance itself easily.

There are misshapen, crooked bodies among the wild beasts, but these animals are killed off faster than the others. Those we see most have their bodies well exercised and keep the best kind of position.

Generally speaking, standing on all fours is much easier than the erect posture of man.

QUESTIONS

1. What does "standing straight" mean to you?
2. What are three ways of telling how we stand?
3. What do you see players do in playing games that requires good balance?
4. If one has good poise he should be able to keep his balance in many positions. (Compare your own balancing with the illustrations in the Appendix of this book.)
5. Why can one not straighten his body at once and keep it so?
6. Describe the body when standing tall and straight.
7. Name some causes that lead to stooped or crooked bodies? How may food, rest, and sleep be causes?
8. How may exercise help us to have straight bodies?

A list of causes leading to crooked bodies. Mark those you have experienced or observed:

Carelessness

Carrying books on one hip

Walking in bad position with hands in the pockets

Wearing clothes that press on shoulder muscles

Wearing clothes that are too tight

Carrying heavy loads

Fatigue

Lack of physical strength

Exercising in bad posture

Not exercising the trunk muscles enough

Some of the good that straight free bodies bring. Again mark what means most to you.

Better appearance

Better feeling

A free feeling

Better sense of a fine body

Plenty of room for lungs and other body organs



A SELF-DISCOVERED POSITION

Note the straight back, particularly at the waist line

XI. SETTING-UP EXERCISES

Setting-up exercises for boy and girl scouts are an important part of their drill. Soldiers and cadets in military schools have different ones from the scouts.

The scouts set-up their bodies before they start on a hike. The soldier takes strenuous setting-up drills and tires his body. The military cadet drills to gain the military bearing. The person giving fifteen minutes night and morning to bed-room exercising is making up for the outdoor walks and games that he does not have.

There are as many ways of taking setting-up exercises as there are different needs for them. Nearly everybody, no matter what he does or how much exercise he has, should take time to set-up his body a few times during the day. This helps to keep the body carriage natural.

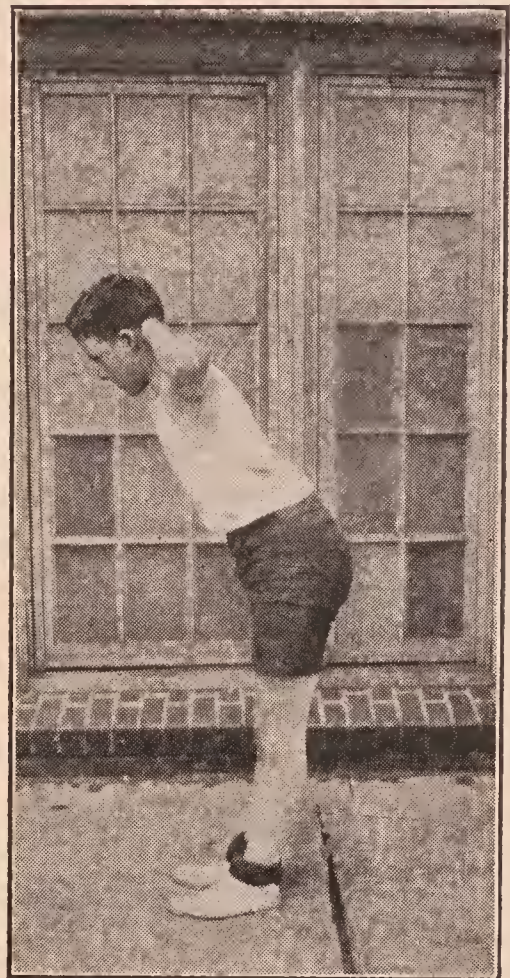
Everybody should hunt for the muscles he does not use enough and exercise them. He should hunt for muscles that are exercised too much in one direction and pull and stretch them in other directions. The shoveler should bend his trunk backward and pull and stretch it. One who sits working over a desk should exercise the neck muscles, so as to bring the head up and the chin in. It is good to stretch as animals do after they have been still for a while.

Any exercise that brings the body to good carriage and makes trunk and legs and trunk and arms work together

is good. We can not live in houses and sit long hours in school rooms and keep our bodies in good form without giving special attention to them. If you need only to stretch and squirm, do that; if you need to correct stooped posture, put your effort there and work patiently.



NECK FIRM



TRUNK FORWARD BEND

Setting-up exercises that do not make the body *tired*, but make it *ready*, are best for growing boys and girls. In two minutes or less in a good drill all the muscles can be exercised several times. When such a drill is properly taken the body is set-up — bone and muscle held in proper position — and ready for outdoor play.

In the setting-up drill we should twist and squirm to relax the body. When we lift or bend or move one part every other part should be held firm, either supporting or allowing the moved part to pull against it. For example, when we hold our hands on the hips and bend the trunk to the side, the rest of the body should be firm, allowing the pull to be made. This stretches the side muscles of the trunk. We must really stretch and pull as we do in play before it does us good.

There are other kinds of special exercises. One of these is the rhythmic. They are not taken in two minutes or given under the commands of a leader. The girls whose photographs are included in the Appendix of this book took such exercises. They follow natural body motion and are quite free. Setting-up exercises should be natural, and they may be rhythmic too.

SUPPLEMENTARY READING

Animals Give Signals

The lynx was hunting prey. He had let a rabbit and a chipmunk escape already. He found the otter's track and followed it. He reached the creek and hid himself behind a spruce bush. He saw a whole tribe of otters coasting down a snow-slide made by the parent otter. He went a long distance around and reached the top of the bank. He was ready to spring. At that moment the parent otter heard the snow crack and saw a spruce bough move. She gave a short sharp cry. The otters did not wait to look. They ran madly. They were well out of sight before the lynx could spring. — From *Fur, Feather and Fin*, Ernest Seton Thompson (W. A. Wilde Co., Boston).

The Command "Attention!"

In drills given under command, "Attention!" means that all take position and be ready. The usual way is to bring feet together, arms at sides, and stand tall. A well-drilled troop can do this instantly. But a group not so used to it may make all kinds of blunders. Some are slow. Some are quick enough, but their bodies are too stiff. The trouble comes from not being natural, and such a beginning starts the whole two-minute drill wrong.

How differently one takes this command under other circumstances. Out in the woods among wild life, let a companion give a signal and in an instant one is alert, listening, ready to move. He comes to attention naturally. In the setting-up drills it should be natural too. Learning to obey the signal "Attention!" properly will make the whole drill snappier and better.



ATTENTION!

Observations about how Animals Keep Themselves in Condition

Wild animals have to be active and be ever on the alert in order to live. This keeps them in condition.

Keepers of animals in a zoölogical park notice the new beasts brought from the wild state to see if they exercise well. If so, they are likely to do well in captivity. The walking back and forth in the stalls of lions, bears, and other such animals in captivity, is satisfying exercise to them. This keeps all the large muscles in good use.

The horse lies down and rolls from side to side several times, bending and throwing the legs. He gets up and shakes himself.

This serves as setting-up exercises for him. The cat often takes a big stretch that reaches every part of its body after it has been lying down. The dog stretches and stretches first one part of his body and then another after he has been resting. It puts his body in readiness for whatever he may want to do.

Man too has a natural way of stretching and pulling himself together. This is the best kind of setting-up drill.

QUESTIONS

1. Did you ever take a snappy, two-minute setting-up drill?
2. For growing boys and girls what is the purpose of such drills?
3. How do they train one in good balance?
4. Why is it easier to make movements when music is played?
5. After you have taken a good setting-up drill several times see if you can explain from your own experience the right and the wrong way to take them.
6. Observe a group taking such exercises and see who takes them easily and correctly.
7. How may plenty of free outdoor exercise make these drills unnecessary?
8. Tell of instances on the street or elsewhere when you naturally obeyed a signal meaning the same thing as the command, "Attention!" in the setting-up drill.

XII. HOW OUR TEETH GROW

We have two sets of teeth. If the first set is good the second set has a much better chance to be good also. Neither our first nor our second teeth are good unless we exercise them. We exercise them by chewing or gnawing such foods as toast, apples, lettuce, and meat. This exercise causes the blood to circulate around the roots of our teeth. In this way our teeth and our jaw bones get plenty of nourishment.

If our teeth grow as they should, the two rows fit together and our mouth closes easily. But now and then teeth project, causing a misshaped mouth and sometimes an open one.

Usually when our teeth do not fit together well, it is because our jaw bones have grown wrong. Swollen tonsils or adenoid growths in our throats may make them grow unevenly. The loss of the six-year molars causes unevenness too. These are the first teeth of the second set. When they are lost the gums shrink and the jaw bones do not develop as they should.

We should save the six-year molars. When our teeth do not fit together well and do not let us close our mouth, we should have them straightened. If we do not, we may become a mouth breather.

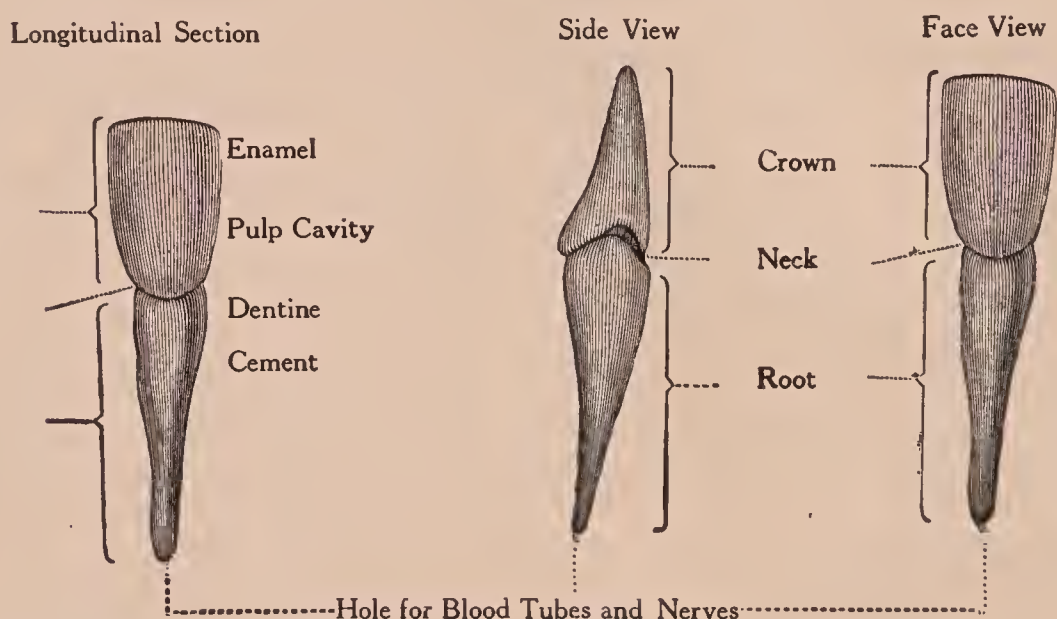
We should make our first set of teeth as good as we can.

The care we take may make the difference between the second set having even teeth, or ill-matched ones.

SUPPLEMENTARY READING

A Dentist Tells how a Tooth Grows ¹

A tooth and a rose grow in just the opposite ways. The rose is first a firm, closely-packed bud. As the bud grows the layers



PARTS OF TOOTH (INCISOR)

keep spreading apart. When all the parts spread, the rose blooms. A tooth grows by thin layers folding together. At first the layers are soft and tender. As the tooth grows they pack together. When the tooth is perfectly formed, the parts are folded so solidly that there are no leaks for acids to seep inside it.

As the rose gets its food from the sap of the rose bush, so a tooth gets its food from the blood which flows to it. The blood carries

¹ The facts stated here were given to the author by Dr. W. B. Hoofnagle, a dental surgeon, also a member of the medical staff of Georgetown University, Washington, D. C. This dentist wants boys and girls to care for their teeth, and not allow bad conditions to develop.

to the tooth various substances, such as lime, salts, and other elements.

The crown of a tooth forms before it appears out of the gum. While the crown of a tooth of a second set is forming, the roots of the baby tooth below it melt away. The crown of a tooth comes through the gum before its root is fully formed.

When a tooth is not perfectly formed, it means that at some time its growth was interfered with. Perhaps the jaw bones were not exercised enough or the food did not have enough tooth-substance in it. When a tooth by reason of decay loses its nerve, it stops growing.

Interesting Facts about the Teeth of Animals

The beaver and the rat belong to the family of gnawers. It is not food alone they bite, but material of various kinds. Their teeth suit their habits in this regard. The front teeth are chisel-shaped at the ends. Most of the enamel is on the front part of the tooth, and is formed in horizontal layers. These teeth wear away, but they grow out again. They keep growing just as our finger nails do. The squirrel's teeth keep growing too. A lady had two squirrels; one let her make a pet of it, the other would not. She cracked the nuts for the pet squirrel and gave it the kernels. Its teeth grew so long they came through the front of its mouth. The other cracked its own nuts and its teeth were kept worn down. For a wide space on each side of their sharp front teeth there are no teeth at all. Away back in the jaws there are a few grinders.

A baby seal loses its baby teeth just after birth.

Only one baby tooth appears in the kangaroo's mouth. This is in the back part of the jaw. The others are growing beneath the gums, but the second set of teeth replaces them before they are ready to appear.

When the whale loses its baby teeth there appears no second set. Instead, large horny plates called "whale bones" take the

place of teeth. These serve the whale better than teeth could in securing and eating the kind of food that he needs.

The teeth of animals have changed during the ages to suit the needs that animals have for them.

QUESTIONS

1. How are teeth exercised? Why does exercise make the teeth and jawbones grow?
2. What causes jawbones to grow wrong? How is this harmful?
3. Why should teeth, that force the mouth open, be straightened?
4. What have we to do with making our teeth even?
5. What are the parts of a tooth?
6. What causes leaks in teeth?



Courtesy of Dr. A. E. McDonald,
Washington, D. C.

AT $1\frac{1}{2}$ YEARS OF AGE THE PERMANENT TEETH ARE FORMING BEHIND THE BABY TEETH.

Note in the photograph, lower jaw at the left, the six-year molar forming beneath the gums.

XIII. HOW WE PLAY

We can tell how strong we are by what we can do. If we always do easy things, we may think we have good strong bodies when we do not have. If we quit playing a game when it begins to be a little hard for us, we are helping



BASKET BALL IS A GOOD GAME

our bodies to be weak. We do not want to do that. It sometimes takes pluck and courage to stay through a hard fought game. We are proud of ourselves when we do it. We are ashamed to be a "quitter."

But if our bodies are not sound, it is foolish of us to play just as if they were. If we can not see well, we should not try to play ball games until our vision is cor-

rected. We should not try to play harder than our strength will let us. We should not try to do too much if our bodies are weak.

When we play a new game, we should take time to learn it. We should learn its rules, and then obey them. We should learn how to play with others in a team game. We should learn just how to do things in a game. There is a trick in jumping and in throwing, for the way we do these things has a great deal to do with the results. The strongest boy is not always the best jumper, or the most accurate one at throwing.

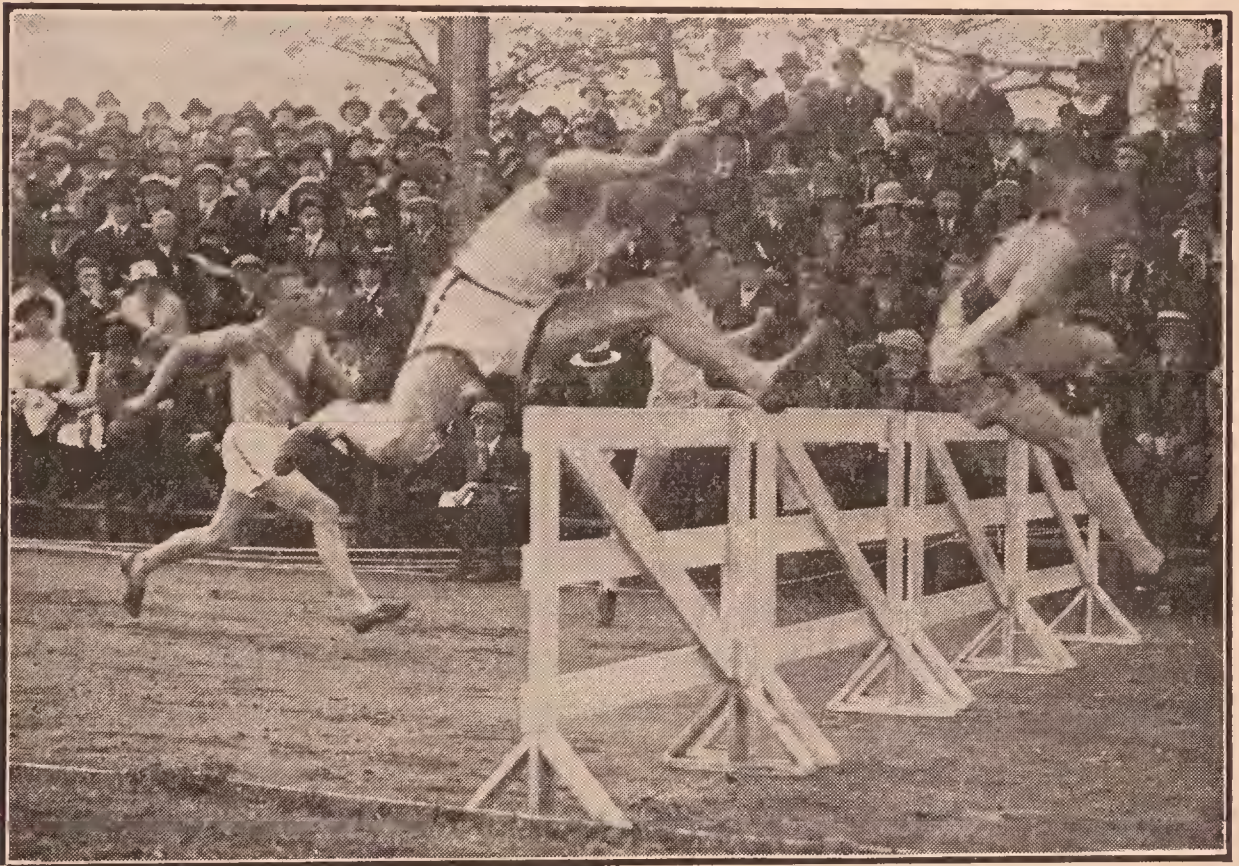
How good it is to play! We are like the free creatures of air, water, and forest when we play. Our bodies can do things that seem impossible at other times. We control them even though we are moving rapidly. Our whole body machines are active. The blood runs fast. Our hearts beat fast. We must breathe fast to get air. Our faces glow and eyes sparkle.

We should play games that we like, though we should sometimes play games others like too. In the Appendix of this book different games and contests are described. In some of these you are told what record you may expect to make. The games are of every variety, and the boys and girls who learn to play them and have good fun doing it are going to be winners some day not only in play but in other things too.

SUPPLEMENTARY READING

Hurdle Races

In a hurdle race one runs, jumps a hurdle, runs again, jumps another hurdle, and so, until the goal is reached. The hurdle is a bar placed horizontally a distance above the ground. The bar is placed high for athletes, but not so high for children. The



© Underwood & Underwood, N. Y.

HURDLES AT THE FINISH

athlete in the contests of the Olympic Games runs a hurdle race 120 yards long, jumping several hurdles three and a half feet high.

Forest Smithson, an American, made the world record for this race. So skillful was he in making the jumps that he could get the foot of the forward leg to the ground while the other was still level with the top of the hurdle. In this way he was ready to run almost before he had finished the jump. This gained for him

a few seconds of time which are important to save when trying to win a world championship. His skill in hurdling illustrates how learning the trick or the way of doing a thing helps in playing games.

Great Swimmers

Swimming is a sport enjoyed by both children and adults. Of course the best way to enjoy swimming is to go into the water for a half or three-quarters of an hour every day during the warm months. Some people, however, who are very good swimmers and wish to be leaders in this sport, swim for very long distances and often in water having strong currents. Recently a woman swimmer swam continuously for nearly 57 hours. Of course an ordinary swimmer does well to swim for two hours, and this is too long for any but trained swimmers and highly healthy individuals. The expert swimmers have gradually become used to this form of exercise and are prepared to take risks without harm to themselves. It is surprising what such training will do. Some of the unusual swimming records of today are the following:

A boy six years old swam the Delaware River — 2 miles in 45 minutes. He had learned to swim when 3 years old and had practiced three years getting ready for this feat.

Gertrude Ederle, of Brooklyn, New York, swam the English Channel, from the coast of England to the coast of France, making 31 miles in 14 hours and 31 minutes. This took 8 hours from the record made fifty years before by a man swimmer and 2 hours from the shortest record made by any swimmer of the Channel up to that time. Since Miss Ederle's record, a swimmer has cut the time to 10 hours and 45 minutes. Because of the strong currents, the English Channel is difficult to swim and it is an outstanding accomplishment to have succeeded in swimming it. When Miss Ederle was seventeen years old, she swam 21 miles in the Hudson River in a little more than 7 hours.

George Young, a youth also seventeen years old, set out with 103

contestants to swim from Catalina Island to the California coast near San Pedro. He won the race, making 22 miles in 10 hours and 47 minutes.

Interesting Observations of Play among Creatures of Nature

Many creatures of nature show periods of gladness that are not like their usual temper. Young horses, sheep, and goats leap and run in a playful way, as any one who has observed them often has discovered.

One can not easily tell when animals play. It seems to one looking on that sea-lions in making the wonderful loops through the water must be having great fun, but it may be just exercise. Mountain goats and chamois make high jumps as if they were set on springs. This must be pleasurable to them whether they ever make pure play of it or not.

But there are instances where it is evident the exercise is play. A raccoon that had grown very fond of a particular dog would tussle with it, grabbing its throat, yet neither injured the other. It was just play.

Barn swallows have been observed playing with a cat. One at a time they fly down and pass quite close to it. Of course the cat could never catch one on the wing. It looks as if they were just teasing.

Groos in his book on the *Play of Animals* tells of the chamois sliding down a snow-covered incline. It first makes movements with its legs very much as in swimming, then slides down. It will climb up the incline just to do the same thing again. When there are several animals about, one after the other will try the sliding until all or nearly all have played. This is also a means of travel that they sometimes use when they are not playing.

The beautiful songs of birds are surely sung in the play spirit because they seem to express so much joy.

Flying squirrels have been seen frolicking. A naturalist saw in a grove near Philadelphia nearly two hundred playing in this



Courtesy of Henry Miller News News Picture Service

GERTRUDE EDERLE

way. A few began gliding from tree to tree, and after a while others joined them. Soon there were scores at a time crossing from tree to tree in every direction. Apparently it was done just for the joy of the flight.

QUESTIONS

1. Tell of experiences in play that tested what your bodies could do.
2. Describe play where good strength counts for much more than anything else; where the way or the trick of the game is quite important; where good endurance is necessary.
3. Name a few games where a free easy use of the body puts a player at a great advantage. Some wild animals combat with the very strong because of their greater skill and wariness in motion. Name one such animal. Name a game that you did not enjoy until you learned to play it right.
4. What does "fair play" mean to you? How can the spirit of fair play be cultivated on the school playground?
5. Look in the Appendix of this book and list all the different classes of games. Do you neglect to play quiet games in your school? What kinds of games are played most?
6. Use the games in the Appendix and try to make the school play better. See what improvement is made during the term.

XIV. OUR LUNGS AND THEIR CARE

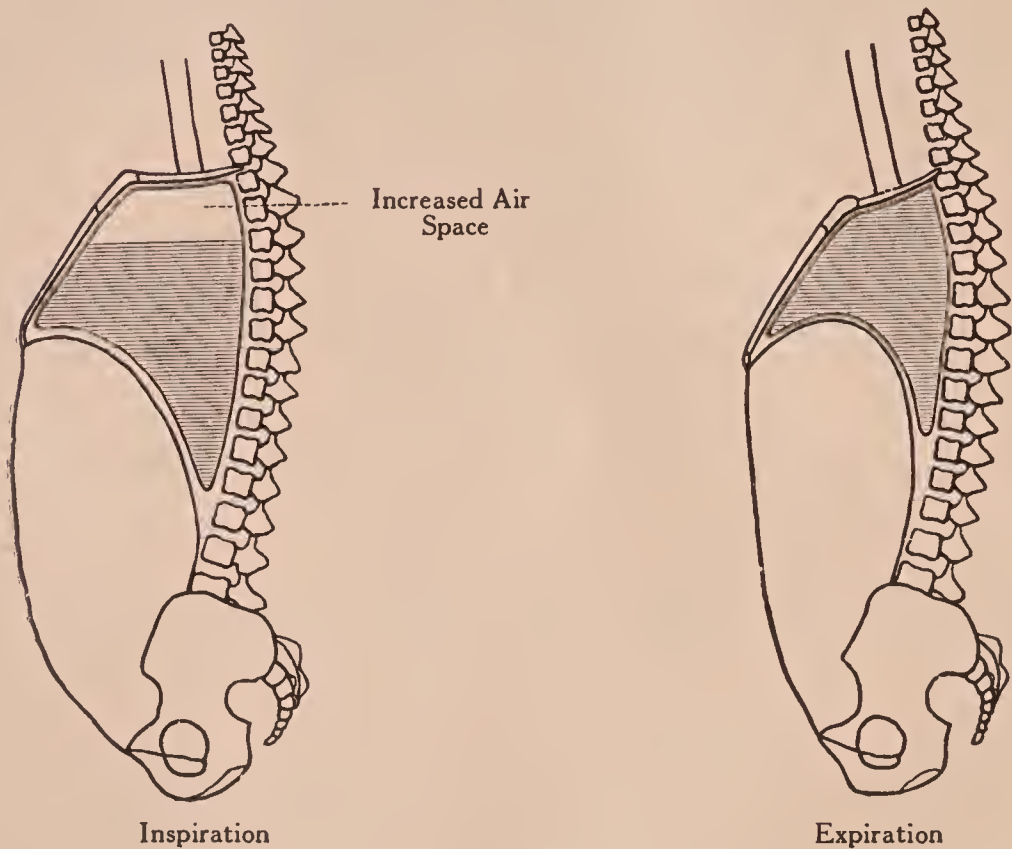
We can not have strong bodies without good lungs. We need good lungs so our bodies can have plenty of oxygen from the air. Neither our muscles nor any part of our bodies can use food unless they have oxygen to burn it.

Our lungs grow by breathing. About once every three seconds they fill with air. It makes them strong to draw nearly all the air they can, and then to expel as much as they can. The air they expel is not needed by the body. It has been used. The heart sends to the lungs the blood that has traveled all over the body. This blood leaves in the lungs waste gases which were gathered from other parts of the body, and it takes up oxygen from the fresh air found in the lungs.

When we exercise, blood flows more rapidly to the lungs to get the oxygen and to leave waste gases. Our lungs then have more to do. They expel the waste gases. They draw in fresh air. This makes them grow.

We should breathe through our noses and not through our mouths. When we breathe through our noses, the air is brushed by little hairs in the nose lining. In this way dust and dirt are removed from the air. Adenoid growths in our throats and swollen tonsils usually stop the nasal openings and then we are forced to be mouth breathers. If we are mouth breathers we are almost sure to have colds often. We should breathe through our noses.

To have strong lungs we should breathe fresh cool air when we sleep. We should stand and sit straight, that our lungs may have room to fill themselves with air at each breath. We should practice taking full breaths until it



DIAGRAMMATIC SECTIONS OF THE BODY IN INSPIRATION
AND EXPIRATION

is a habit. We should take long walks and play out in the open and so exercise our lungs.

To live a long life we need good lungs. To fight tuberculosis and many other diseases we need good lungs. To win ball games and take long hikes we need good lungs. To have strong bodies we need good lungs. We can have good lungs, for we can help them grow strong.

CIRCUMFERENCE OF THE LUNGS

Use a tape measure to find the size of the chest when the lungs are emptied, and the size when the lungs are filled.

The difference between this measurement when the lungs are emptied and when they are filled tells your chest capacity for breathing. You should measure for this difference often enough to know how much more air you can breathe as you grow bigger.

BREATHING EXERCISES

For Out of Doors or with Open Windows

Repeat any of the breathing exercises given below several times. Select one exercise at a time and practice it.

1. *Stand tall.* Breathe in all the air you can.

Then while your teacher counts 1, 2, 3, see how much more you can breathe in. Keep repeating this exercise day after day and you will soon learn that after you think you have breathed as much air as you can that you can breath more.

2. *Stand tall.* Mouth closed.

Inhale while silently counting to ten, if it is easier to count slowly, or to twenty if it is easier to count fast.

Exhale slowly.

3. *Stand tall.* Mouth closed.

Lift the arms sideward, upward, stretching the body tall and inhale while doing so. (Do not lift the shoulders too high.)

Lower the arms and exhale, patting your chest.

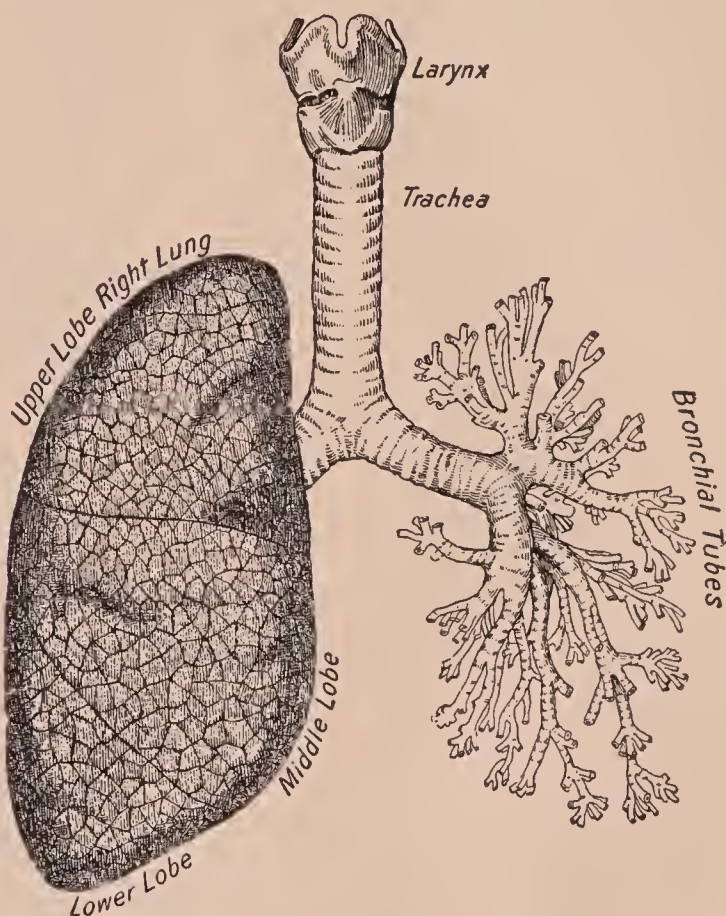
Be sure to empty your lungs of all the air that you can.

4. The same as No. 2 except the arms are raised forward and up.

Arms are lowered sideways in exhaling.

5. *Stand tall.* Mouth closed.

Place hands on hips. Breathe deeply. (Do not let all



LUNGS AND AIR PASSAGES

The right lung shows the lobes and their divisions, the lobules. The tissue of the left lung has been cut away to show the air tubes.

the breathing be wholly in the upper part of the chest. Let the lower trunk help.)

Pat your chest when you exhale.

6. Mouth closed.

Exhale with mouth open as you bend your trunk for-

ward, knees straight. Make a noise doing it. Then straighten trunk, drawing in as full a breath as you can while doing so.

Exhale slowly.

SUPPLEMENTARY READING

Helps for Good Breathing

Breathe fresh air and air that is not overheated as many hours of the twenty-four as you can.

If you breathe through your mouth, find out why.

Stop for a couple of minutes about three times each day and stand straight as you can and breathe deeply and slowly. This makes your lungs strong and develops your chest.

Practice breathing exercises such as those given on pages 75 and 76 until you naturally breathe so. Breathing muscles have to grow strong by use the same as other muscles. Use exercise five given on page 76 often.

There is no better way to grow strong lungs than breathing well while you walk.

QUESTIONS

1. Turn to the drawing, page 76, and look at the lung. Tell how it is held in place. Locate the tiny air sacs.
2. Why is it important that we breathe deeply and make the lungs fill up with air?
3. Why is it important to breathe through the nose rather than the mouth?
4. What are strong lungs? How do we make them strong?
5. Why is fresh air better than air that is not fresh?

XV. WALKING

We should walk with the same ease of movement that most animals have.

The trunk is united to legs and arms by long muscles. The spine keeps our body in balance in a wonderful way, as we have already discovered. Every time we step, movement runs up through the trunk and on to our head. It is not one leg striding and then the other as if the trunk had nothing to do with it. It is the body standing tall, balancing itself first on one foot and then on the other. The secret of walking naturally is just that, and always straightening the body to its full height each time.

The foot is pointed straight forward. The body is balanced well over the ball of the forward foot before the step is completed. When the body is thus balanced, the other leg is free. It will swing easily. Thus we get the rhythm that makes walking so enjoyable.

Try doing this: Do not think you are going to walk. Just stand easily with one foot forward. Let the body's weight balance over it. Feel tall. Notice that the other leg is free. Swing it. Let it come forward, and then rest your weight on it. Feel tall again. Now the other leg swings. If you keep playing with the walking movement in this way you will soon discover its secret — its wonder. No one can tell it to you.

SUPPLEMENTARY READING

Shoes and the Feet that Wear Them

The shoes of the American soldier are one of the best styles of shoes made. They have a low, broad heel and thick soles. They do not cramp the feet: In them the soldier can take long marches without making his feet pain and hurt.

Great care is taken in fitting the soldier with his first army shoes. The most careful measurements are made, and when he is being fitted he walks down an inclined plank to test the fit. When he is once properly fitted, his size is marked and this is used when he needs shoes again.

No one can walk well in shoes that do not fit. People who wear narrow shoes with high heels have become used to walking and standing in the wrong way. It often makes them appear awkward.

It is important that boys and girls wear shoes that fit them, for growing muscles and ligaments are easily harmed by pressure. Besides, the body will not grow straight if it is thrown out of balance by wearing the wrong shoes. A shoe, broad across the balls of the feet, neither too large, nor too small, nor too light, nor too heavy, and with low heel, is best.

Why Some Armies Do Not Have Their Soldiers March in Step

A soldier in making long marches finds it tiresome to take just the same length of step that other soldiers take and to step in the same time all day long. He loses his own rhythm and it makes his muscles very tired to use another rhythm. This is why in some armies the soldiers are allowed to walk without really marching.

**Interesting Observations on the Propelling Motion of
Creatures in Nature**

The deer runs with a smooth united movement of the whole body; one bound starts the next, and so on. This describes a kind

of rhythm common to many wild animals. The jumps of the mountain goat and chamois are rhythmic in that sense; so is the flying motion of most birds.

One jump of the rabbit seems to produce a spring that starts the next.

The elephant, though large and clumsy in appearance, sways its whole body in a most rhythmic way when walking.

It is fascinating to watch the action of the muscles of the tiger's body as the animal walks.

The tail and fins of a fish help to guide and propel it through the water. Flippers and a tail serve a like purpose for the sea-lion. Wings propel a bird through the air.

QUESTIONS

1. What experiences have you had in walking as described in this lesson?
2. What is the style of shoe worn by the American soldier?
3. What are the marks of a good shoe for anyone?
4. Aside from crippling the feet, what other harm does the wrong shoe do?
5. How should the foot point in walking? From a physician learn how a weak arch may be straightened, and what should be done for "flat foot."
6. To find your natural rhythm in walking you should first walk properly. Why?
7. How would you suggest that one find his natural rhythm?
8. Let a group who carry their bodies well walk on the playground, and see what you notice about their movements.

XVI. REST AND SLEEP

Our bodies grow while we sleep. They rest too. Our nervous system must have rest. Our brain cells must have sleep. A twelve-year-old boy or girl needs to take about nine or ten hours of sleep each night. If we lose much sleep, we shall not grow as we should. If we lose enough sleep, our bodies will be in a starved condition very much as they are when we do not feed them well.

We should have the sleep we need. If we do not have enough sleep, we can only make up the loss by sleeping. There is nothing to take the place of sleep. If we do not have enough sleep while we are growing, we are not likely to have good bodies when we are full grown.

The sleep we have should be good sleep. When we sleep we need good air to breathe. We should have a quiet room and we should not sleep in clothing that is moist from being worn during the day. We should have as good sleep as we can have. Then our bodies grow, and they rest too.

Sometimes during the day we should rest our bodies. We should rest after we have been doing things for a few hours. It is better if we rest at about the same time each day. Then we form the habit of resting and are not likely to forget it. We should rest our minds too! We should learn to relax and just rest as contentedly as animals do. Good sleep and rest do us good.

SUPPLEMENTARY READING

Helps for Good Sleep

Have fresh air in your room when you sleep. Put up a screen if there is too much draft or wind.

Make yourself ready for sleep. Hang up your clothes to air and be orderly.

If you are excited and can not go to sleep easily, breathe deeply until you are calm. Sometimes by drinking warm milk or eating a few crackers, sleep will come.

Do not worry about things. Think pleasant, happy thoughts. Be hopeful about anything that troubles you, for your sleep will be better, and your mind will be forming a good habit.

Helps for Taking Rest

Do not play one active game after another with no time for rest just because others do this. If you feel that you need to rest, it is a good sign that you do.

When you are busy and stop for a rest period, do not make the time so long that the spirit of work is lost.

Long idleness causes fatigue too. To rest from this, try to find something to do.

QUESTIONS

1. How many hours of the twenty-four are required for your sleep?
2. Name several ways that growing boys and girls may rob themselves of sleep.
3. How can repair from loss of sleep be made?
4. How is lack of sleep and rest harmful to our bodies?
5. What are good conditions for sleeping? for taking rest?
6. How should one feel after a night's sleep? Why is good sleep especially important for a growing boy or girl?

XVII. OUR BODIES LEARN TO DO THINGS

If we should name the many things we like to do, it would fill several pages of a book. When we are sick, we get well quicker if we are given something to do. The picture shows soldiers at work in their hospital. The



DISABLED SOLDIERS LEARNING HANDICRAFTS

young women are teaching them to weave rugs and baskets, and to make other things. Because the soldiers are busy doing things, they will be well quicker; also they gain better use of their crippled arms and legs. We all like to

do things and when we are well we can do many of the things we like to do.

Many animals can do things apparently without learning how. Young ducks swim the first time they go in to the water. Young birds can usually fly a little the first time they try. Our bodies are made so that we can learn to do nearly anything we want to do, *but we must first learn.*

Boy Scouts have listed seventy-six things and Girl Scouts fifty-three things that they like to do. See how many of these you would like to do.

Let us learn to do something worth while each year and learn it so well we will not forget.

Teach our young bodies something new,
It'll lead to ten things we can do.
Let our bodies idle be,
Some day we'll cry "Oh useless me!"

REFERENCES. — *Handbook for Boy Scouts*, purchased from Boy Scouts of America, No. 2 Park Avenue, New York City. Price in 1928, 50 cents. *Handbook for Girl Scouts*, purchased from Girl Scouts, 189 Lexington Avenue, New York City. Price in 1927, 50 cents. *Bulletins on Gardening, Raising Farm Animals, Sewing, and Cooking*, U. S. Department of Agriculture, Washington, D. C. No charge. (Write also to your own State Agricultural School.)

SUPPLEMENTARY READING

"Do Small Things Well" says the President

The President of the United States sent a Christmas greeting to the Scouts and 4-H clubs. In this message President Coolidge said:

"We need never fear that we shall not be called on to do great

things in the future, if we do small things well at present. . . . There is a time for play as well as for work. But even in play it is possible to cultivate the art of well doing. Games are useful to train the eye, the hand and the muscles and bring the body more completely under control of the mind. When this is done instead of being a waste of time, play becomes a means of education."

Whoever occupies the White House as President and First Lady are Honorary President respectively of the Boy Scouts and the Girl Scouts.

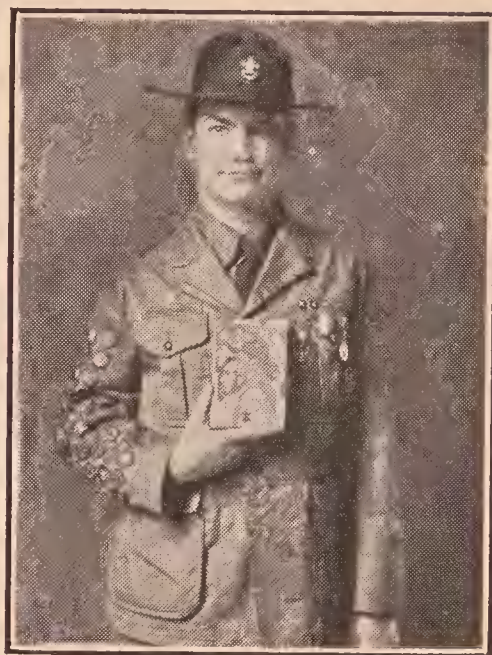
Do Nature Creatures Learn to do Things?

Many of the things done by nature creatures do not have to be learned. The caterpillar knows how to spin its cocoon and to tie it fast without learning. The little chicken walks about after it is a few hours old. Young robins frequently leave the nest before they are quite ready to fly. But they get out of the nest and after a little practice fly.

Some birds practice until they learn to sing different tunes. Baltimore orioles kept where they did not hear the song of their parents did not sing it. They learn their song from hearing it sung.

The mocking bird, brown thrasher, catbird, starling, yellow-breasted chat, and some other birds learn the songs or the calls of different birds and imitate them. Parrots learn to whistle and to talk.

Several birds and many beasts may be taught fairly easily to do tricks and some learn to do things by their own intelligence. But they do most by instinct without really learning.



Courtesy of Columbia Council,
Boy Scouts of America

LOREN ADAMS, DISTRICT
OF COLUMBIA, PRESENTS
HANDBOOK FOR BOYS TO
PRESIDENT COOLIDGE.

Loren has mastered 68 of
the 76 Boy Scout activities.

QUESTIONS

1. How do our bodies learn to do things? Give experience in learning to do some one thing well.
2. How many different things can the members of the class name that they like to do?
3. Why is it very bad for us to grow up unable to do things?
4. What ability must a boy scout have who wins a merit badge in a handicraft?
5. What is required to win a Golden Eaglet in Girl Scouts? If you have a girl scout manual in the school library, read what is required to win some of the twenty-one merit badges leading to the Golden Eaglet badge.

XVIII. WE CAN MAKE OUR WORK EASIER

We should take unnecessary burdens from our work in every way we can. When we wash dishes we should have plenty of hot water and fresh clean towels. When we work at our desks we should have no disorderliness about us, and our pencils, if we are using them, should have a good point. We enjoy doing what we are ready to do. We should have the necessary tools to work with. Let us not grow up burdened so that we can not accomplish things. If habits can save our minds, let them do it. If our heads can save our heels, let them do it. If a shelf or window or table or tool will save us from labor and the burden of it, let us be master and have them.

SUPPLEMENTARY READING

How Farm Work is Made Easier by Good Machinery

At one time farmers cut their wheat with a cradle. There was no reaper. Holding the long, curved handle, the cradler would make a big sweep with his arms and send its large knife through the standing wheat. As the wheat was cut, it fell on a row of long teeth fastened to the cradle for this purpose. Back and forth across the field he worked all day, cutting the yellow swaying grain. But at the end of his day's work, only a small strip of the field had been covered.

A man binding followed the cradler, tying the wheat into bundles. When evening came, if the sky showed signs of heavy rain, everybody that could be found hurried into the field to build the bundles into wheat shocks.

Then the reaper was invented. Now this machine cuts more wheat in crossing the field once than a cradler can cut in going several times across. It binds the wheat into bundles, too. Harvesters can now harvest many acres in a short time, and the work is much easier than when cradler and binder did it by hand.



A REAPER IN USE

Doing Sitting Work by Standing and Standing Work by Sitting

Certain work both in the home and in factory requires long hours of sitting or of standing. When this can be done by sitting a while and then standing, it is easier. Ironing and much kitchen work can be done so, if tables and chairs are of proper heights. By changing position, bones and muscles that have been held long in one way are rested.

In a factory an American engineer interested in making work easier made a chair for handkerchief folders. It is of the height that allows the elbow to be at the same distance from the work table when sitting as when standing. A foot-rest is attached to the table. The workers change from one position to the other.

They are less tired after the day's work and they have accomplished more.

How a Man Loaded $47\frac{1}{2}$ Tons of Pig Iron Easier than he had been Loading 12 Tons

In a big steel factory, thousands of men were at work loading big pieces of iron into a car. A man stood watching them. He saw that the workers were under load much longer than they needed to be and that there were many useless motions made. He pointed out to the manager ways of lessening the effort of the men and yet let them accomplish more.

One day when this man, who was an efficiency engineer, was at the factory, the manager called a big, strong workman to him and asked him if he would like to earn more money. Of course he wanted to earn more money. The manager showed him a pile of pig iron three times the usual amount for a day's work and told him if he loaded it he could earn more, and that he could do it if he did as he was told. Then the efficiency engineer took charge. The big workman obeyed him, lifting and carrying the load as he was told to do and resting when he was told to rest. At the end of the day he had loaded the big pile. Day after day he put into the car more than 40 tons of pig iron instead of the 12 tons that had been his record. Working by the new method he was free from the load 58 per cent of the time.

More Work in Less Time

When the Honorable Herbert Hoover was Secretary of the Department of Commerce, he organized a division of workers whose business it is to help the nation to do its work in less time. These men and women have found that there is much wasted effort because manufacturers make more kinds of products than people need; for example, 66 different varieties of paving brick, 78 of beds, springs, and mattresses, 49 of milk bottles, 78 of bed blankets, and so for many articles.

It takes longer to manufacture 66 varieties of paving brick than five. Also the brick merchant has more to do in keeping in his stores many varieties of brick than if he kept a few. The man who wants to pave his street can select from a few kinds of brick more easily than from a large number. It is cheaper and better for the manufacturer, merchant, and consumer if only five varieties of paving brick are placed on the market. Your mother would save time and money when she goes to purchase a mattress if there were only four varieties — and this number has been found sufficient. Otherwise she pays in her purchase for the extra cost that comes from having on the market many varieties of mattresses. Some industries are learning how to save work, time, and expense by making only the necessary variety of goods. It is a good way to make work easier and living cheaper.

QUESTIONS

1. Name some work you do that you enjoy as you do play.
2. How do we save ourselves from fretting over the little things we do each day?
3. Do you do anything that could be made easier by proper tools? Explain.
4. Why should a kitchen and class room be pleasant places to work in?
5. What does orderliness have to do with making what we do pleasant?
6. Describe a class room that is also a good work room.
7. Describe a kitchen that serves well for what is to be done in it.
8. Tell how you get ready for some work before it is time to do it.
9. Give an illustration of making work easier by changing positions when at work.
10. How do tables of proper height and other such conveniences lighten labor? How does good light help?

XIX. OUR SKIN AND ITS CARE

Our skin is so made that by keeping it clean we save our bodies from giving out bad odors. Inside the body the organs and the muscles make waste as they work just as factories do. The carbon dioxide gas reaches the lungs and escapes with our breath. Other wastes reach the kidneys. Others escape through the pores of the skin. We should wash these away before they begin to decay and smell. We should bathe carefully, using warm water and soap at least twice a week to destroy unpleasant body odors. We should change to fresh clean underclothing once a week or oftener. This is especially necessary if we perspire much.

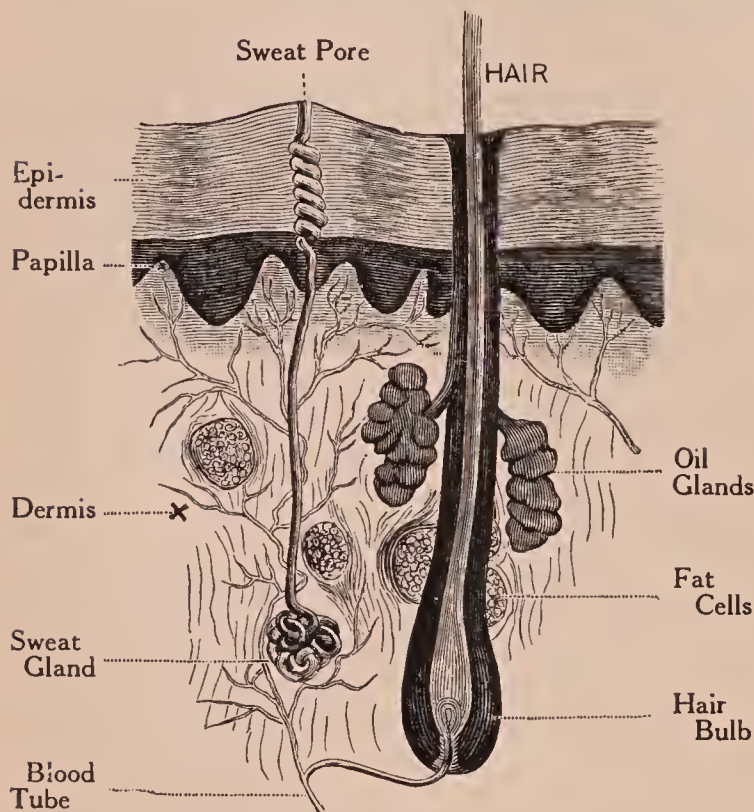
Our skin is so made that it helps to keep our bodies cool. We perspire a little all the time. In doing some kinds of work people may perspire as much as several quarts of perspiration a day. This perspiration comes from sweat glands or sac-like tubes in our skin. The glands or little tubes open on the surface of the skin. Our skin is covered with these openings or pores. We should bathe frequently to keep oil and dirt from filling the holes up. Then, too, we also keep pus germs away by having our skin clean.

Our skin not only covers and protects the body, but it is also a sense organ. The touch cells with their nerves are in it. The skin of our finger tips and of the tip of the

tongue has many touch cells. Through the finger tips we learn the hardness or softness of an object and what its shape is. We can tell what is rough and what is

smooth. We could not learn very much from holding things in our hand if the touch cells were not in our finger tips.

Our skin grows. It keeps soft and pliable. We make it better by rubbing it well with a rough towel after we bathe. This gives it exercise. We should wear porous underclothing that takes up the



VERTICAL SECTION OF THE SKIN

perspiration, and in winter our clothes should be soft and warm.

We do not like to be near persons whose bodies have unpleasant odors. We like to see skin that is clean and shows health. We want the hair to be glossy and clean too. We want finger nails to show that they are cared for and kept clean. Good care of the skin is better than making use of perfumes and powders. People respect us for keeping our person clean and we respect ourselves for doing so.

SUPPLEMENTARY READING

Interesting Facts about the Sense of Touch

The points of two sharpened pencils held side by side on the finger tip seem two, but seem only one when touching the back of the hand. From any part of the skin we can tell differences in the feel of woolen, cotton, or silk clothing.

Some persons can distinguish small seeds, grains, flour, meal, and sand, through the sense of touch. Any one may learn to do so by experience in using the sense of touch. The sense of touch may be so highly developed that a deaf, blind, and dumb person trained to lip reading can tell what another says by placing his fingers lightly on the lips of the person speaking.

The mother spider can tell whether friend or foe has lighted on her web by the vibrations that travel down the radius of the orb on which she rests.

Spiders, ants and bees have tiny hairs, each of which connects with nerves. Their sense of touch is keen. There are touch hairs on the wings, legs, antennae or feelers, and inside the jaws of the honey-bee. Dr. N. E. McIndoo, who has given generously of his knowledge of the senses of insects for use in this book, concludes that it must be through the touch hairs on the tips of the jaws of the honey-bee that it can make the honeycomb of even thinness throughout.

A bat has been known to fly about in the dark in a furnished room without touching furniture or walls. In the thin membrane of its sail-like wings it catches the feeling of air pressure. This, more than sight, guides it in flying.

The star-nosed mole has tentacles around its nose. These are very sensitive to touch. By them it is guided in making its way underground.

The elephant has many touch cells at the end of his trunk. They help him select food. An old elephant that died a short time ago used to select the best parts of his hay, eat them, and

leave the rest. When he was hungry again, he would go to the same pile and again select the best. He did it by feeling with his trunk.

Facts about Odors of Insects, Beasts, and Man

Dr. McIndoo, to whom reference is made above, has detected four different odors about the bee hive: the hive odor, that is the odor from the whole collection of bees, the odor from pollen or bee bread, the wax odor, and the odor of the bee-sting. He has found also that the queen, drones, and workers each has its own odor. Of all the odors, the hive odor is most important, for it is the odor that lets the bees of a colony know each other.

Honey-bees have tiny glands. These secrete liquids, which have odors. The wolf, the deer, and all animals have some kind of scent about them. Many of them know where their kind has passed because of the odor left.

Some animals like the skunk secrete from special glands very disagreeable odors. These odors serve them well by keeping enemies away.

Although man does not have a gland for the purpose of giving him a special odor, the wolf and the bear can tell where he has been by the odors he has left behind. The bloodhound knows the scent of different persons. A boy who was blind, deaf, and dumb is said to have known what persons entered his room by smell.

Interesting Facts about the Coverings of Lower Creatures

The common shore crab grows a shell around it when quite young. This hardens and can not grow any bigger. But the crab must grow, so it sheds this shell and grows another. Each is larger than the one it replaces. The crab has shed several shells before it is full grown.

The bushy tail of the fox is used to keep its body warm when it lies in the cold. Its nose and paws would be in danger of freezing without it.

Animals of the north usually have a heavy pelt or covering. The fox, lynx, bear, minx, otter, are examples. The animals of the south usually have light pelts. The Florida fox is not burdened with heavy fur.

The New England hare sheds its dark coat of summer for a white one to match the snow. Its white coat is also heavier and warmer.

QUESTIONS

1. Why should the wastes be removed from the body liquids?
2. What wastes do they receive? How are these removed from the body?
3. What part of this cleaning work does the skin do? When must we play a part?
4. May our bodies be dirty when no dirt is visible? Explain.
5. Though no dirt may have been seen, why does the skin look different after a good bath?
6. What rewards come from being clean about our person?
7. What is another reason for bathing the skin? For wearing clean porous underclothing?
8. What body odor should a person have?
9. What different services do we have from our skin?
10. Name circumstances where it is important to have clean nails. What are good habits in keeping one's person clean?

XX. OUR EARS AND THEIR CARE

When we say our hearing is good, we mean that we hear as well as people generally do. Some of us hear perfectly what people about us are saying, but can not hear a cricket sing or the keen squeaking of a bat, or the song of the kinglet bird. Too, there are sounds of very low pitch that some of us do not hear. The call of the whip-poorwill is of very low pitch, yet most of us can hear it.

The sounds that the majority of people usually hear are those that are neither quite high nor quite low in pitch. This natural difference in the range of sounds we can hear is due to the mechanism of the ear. If there are some parts of the receiving mechanism sensitive to very high pitch, and some sensitive to low pitch, and other parts to medium pitch, then we can hear sounds of a wide range. But most of us do not hear both the very low and the very high pitched sounds.

It is said that about one third of our grown people have faulty hearing. Sometimes the fault is with one ear only. It is not easy to make our hearing right after it has become imperfect. But we can usually prevent it from becoming faulty. That is what we will do if we are wise.

Most of the deafness of older persons is caused by ear-aches and running ears when they were children. This need not be. We can prevent earache, and if we have it for a time we can have a doctor find the cause and remove it.

We want good ears for many, many years. We do not want to be deaf or partly deaf. We want to hear the joyful laughter of our comrades, the music of birds, and the rustling of leaves in the breezes. We want to hear the noises of approaching cars and signals that let us protect ourselves from danger. We can keep our hearing good by taking care of our ears.

SUPPLEMENTARY READING

Interesting Facts about Ears and Hearing

The dog, rabbit, cat, deer, and horse stick their ears up to listen. The mouse holds its ears so, for it must ever be ready to catch a sound. The pig's ears hang down. It lifts its head to listen. The frog and chicken and other creatures of their classes do not have outside parts to their ears. A skin-like flap covers the opening.

Birds and higher animals distinguish differences in sound. Some birds imitate the call of other birds. On hearing what seems to be a danger sound, a frog chorus will stop at once. A dog knows when his master's voice is harsh and when kind.

The wasp, bumble bee, honey-bee, fly, and some other insects produce sounds. The teeting noise of the honey-bee is caused by the quick motion of a membrane which causes the axillaries at the base of the wings to vibrate.

The rabbit thumps the ground with his paw. It may be a signal for rabbits near by. Grasshoppers and crickets have sound-producing organs on their front legs.

In man the outer ear catches the sound waves which are vibrations of air. This starts the membrane called the ear drum to moving in and out. One of the three little bones within the middle ear is fastened to this membrane and so moves with it and causes the other two bones to be set in motion. One of them pushes

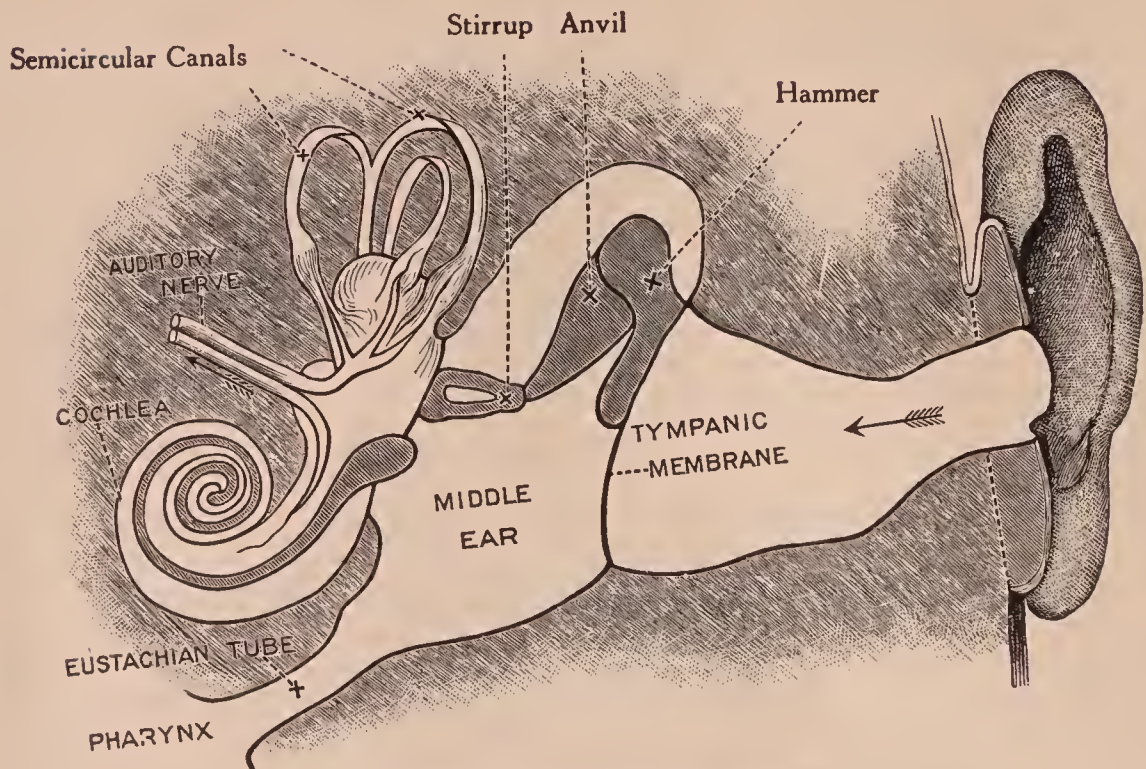


DIAGRAM OF THE EAR

against the next chamber of the ear. This puts the liquid in it in motion which carries the sensation of the sound waves to the nerves that in turn carry the message of sound to the brain. So wonderfully is this innermost part of the ear made that man hears long strains of beautiful music and also noises both far and near. The messages given the brain enable it to judge where sounds are. Often sound is felt in such a way that the whole body moves in its rhythm.

SUGGESTIONS AND QUESTIONS

1. Find, from the whisper test or watch test which your teacher may give you, how well you hear.
2. Find what your habits are in caring for your ears.
3. Remember that once your ears are broken it is usually too late to remedy the broken part.
4. Think seriously about the reason for consulting a doctor for earache, and for not gouging into your ears yourself.
5. Why do many persons become partly deaf?

XXI. OUR SPECIAL SENSES

We learn about the world around us by touch, taste, sight, sound, and smell. These are called our five special senses. Our bodies have organs for these senses. These are eyes, ears, tongue, nose, and skin — especially the skin of our finger tips and tip of the tongue. These organs alone could not let us know about things, but the brain receives the messages sent by them. Impulses travel over nerves from the outer sense organs to the different centers in the brain. It is this working together of brain and sense organs that lets us learn of the world around us.

Of course what we want to learn first is what is good for us and what is harmful. Our sense of smell tells us of decaying foods that we should not eat. Through hearing we are warned of that which we know to be dangerous. Through touch we know whether an object is soft or hard or hot or cold or sharp or dull.

But we want our special senses to do more than protect us. We want to learn all the interesting and useful things in the world that we can. That is why we train our sense organs and our brains to work together. We need to be observing of what we see. We should have the habit of seeing the things about us and remembering what we see.

We may pass a shop window and not remember more than one thing that we saw, or we may pass it and remember practically everything in it. We may know the voices

of a hundred children, so that we can distinguish one from the other, if our brain and sense of hearing are used and we take notice of voices. We may by touch alone be able to distinguish silk, linen, cotton, worsted, and woolen cloths. We may be able to tell at once the inch, foot, yard, gill, pint, and gallon. We can train ourselves to give attention to the way things feel and look; to the odors of air, water, plants, animals, and people; to the sounds of birds and insects, the tones from musical instruments; and to the tastes given us from the natural flavors of foods.

In many, many ways we can train our special senses. There is no other way to learn at first hand about the world in which we live. We can not learn intelligently from books unless we have learned about the world through our special senses first, for people who write books tell us largely of what they have seen, heard, touched, tasted, or smelled. It is only as we imagine what their experiences were that we can understand their books.

Let us learn to notice what we see, and hear, to remember how things smell and to know things by touch and taste. Then the world will seem a bigger, fuller world, and we shall find more to enjoy in it.

SUPPLEMENTARY READING

Helen Keller

Helen Keller was born in Alabama. She is still living. When she was little more than a year old, she had a severe illness and it left her blind, deaf, and dumb. Her parents had heard of a school in Boston where such children were taught, but living so far away



American Bible Society

HELEN KELLER

they did not know how to secure a teacher, nor did they think one would come so far to teach only one child.

Time went on. Helen was no longer a baby, and the older she grew the more unhappy she was. It is not strange that she went into fits of anger, or that she was not sorry for doing wrong. One day she locked her mother in the pantry and left her there. After that she took the first chance she could to fasten the door of a room where a servant was. This time she hid the key.

All this grieved her parents. They searched for help. But what help could there be? There was a specialist far away in Baltimore, Maryland, of whom they heard, and not knowing what else to do they took Helen and went to him.

Through him they learned of Dr. Graham Bell in Washington, and thither they went at once. Helen did not like traveling any better than she did anything else. Her life tormented her as if she were shut in a box. But she liked Dr. Bell. He understood the blind and deaf as few men have done. Helen sat in his lap while he told her parents that a teacher could be found and that Helen would become a happy child.

It was eight months later before a teacher came to the Alabama home. Miss Sullivan proved to be a wise teacher. It delighted Helen to have words spelled into her hands, for she liked the feeling of the movements, but she did not know what they meant. She was as far away from the world as before. Again and again, her teacher tried to make her know that the movements meant the thing she touched. One day when they were at the well-house and water was pouring over her hand as the word was spelled into it, it came to her that *water* meant the cool something she felt. It was a joyous moment. Of this experience she writes in her book called *The Story of My Life*, "I left the well-house eager to learn. Everything had a name, and each name gave birth to a new thought. As we returned to the house, every object I touched seemed to quiver with life." As she lay in her bed that night, she lived over the joy this experience had brought her and for the first time in her life she longed for a new day.

There were no lesson periods. Her teacher taught her wherever they were. Helen built dams of pebbles, made lakes and islands, and dug river beds, not knowing she was learning geography. Then she listened as movements made in her hand told of the round world with its burning mountains, and rivers of moving ice.

Out among nature, touch and the feeling of motion came to take the place of sight and sound. Once she sat in a tree during

the beginning of a thunderstorm. She felt jars as if something very heavy had fallen to the ground near her. At different times she felt the rustling of corn blades and the vibration of the wings of an insect when she shut it inside a flower. She knew when the sky was cloudy, for then the air was cooler. She knew from the smell of the earth when a rain might come.

One day when she was trying very hard, her teacher spelled the word "think" on her forehead. Helen understood that this meant what was going on in her head. It was a new kind of word. It opened up another new world. She was a long time finding what was meant by "love." Was it the warmth of the sun? Was it the fragrance of roses? But now she could think, and when love was explained as something she would not be happy without, she understood.

Miss Sullivan took her to the Boston school where there were other deaf children. What pleased her most was learning to talk. Day and night she struggled to make her throat and lip movements like those of her teacher. Then she practiced repeatedly each word and each syllable. Can you imagine how difficult it is to learn to make sounds that you have never heard? It took all her courage to persist in this long task, but when she returned to her home and could talk to her mother, sister, and father, and by feeling their lips tell what they said, it was her happiest moment.

Thus it is that Helen Keller has come to know the loveliness and beauty of the world and to love and enjoy friends and companions. She reads books. She has met and talked with great writers and actors. She is loved and admired by her friends. Without either sight or hearing she has gained, with the use of the senses left her, great knowledge of the world and its people.

What Special Senses Serve Insects, Birds, and Animals

The senses of smell and touch serve the honey-bee best. Dr. McIndoo gives us yet other facts about this insect: The honey-bee goes out to gather nectar from flowers. When it returns the

guards let it enter the hive because it has the hive odor about it. If it stays away three days and it no longer smells like the hive, it is refused admittance. If the queen disappears the bees of the hive do not know it at first. They seem to discover it when they miss her smell from the hive. Perhaps it is the odor of the beehive that keeps the bees together.

The sense of touch helps in the hive work. Bees fly to their place of shelter before a thunderstorm. It probably is because they can feel differences in the air pressure.

The sense of smell is highly developed in the fly. Taste and smell seem to be one in both the honey-bee and the fly.

The bear and wolf depend largely on the sense of smell, both in finding food and in learning of the nearness of enemies. A wolf follows the scent of meat burning miles away. He can tell whether a wolf or another animal has passed by.

The bloodhound hardly knows anything else but scents and odors. The deer depends on smell, sight, and hearing. It knows quickly if a man approaches the windward way.

The mole depends on touch.

The mouse depends chiefly on hearing and seeing.

The bat finds its way in flying by sensing air pressure.

The fox gives signals by its voice. All birds and animals that do this must depend on hearing to catch the warnings given.

QUESTIONS AND SUGGESTIONS

1. Tell one experience you have had from each special sense — sight, sound, touch, taste, smell.
2. How does the brain help in using the special senses?
3. What wonderful thing has Helen Keller accomplished?
4. Tell experiences where your special senses protected you.
5. In the sense training exercises that your teacher may provide, tell what you discover about training the special senses.

XXII. THE NERVOUS SYSTEM

Look at the action picture below. See how the movement is held and the body strength united for one purpose.



Wide World Photos

AN ACTION PICTURE

It is through our nervous system that we learn to do things, and to control our bodies.

We have just seen that the nervous system is most important in the use of our sense organs. Without nerves and nerve cells in the brain, we could not see or hear or taste or smell or feel by touch even though we

have sense organs. In the same way, the action of heart, lungs, stomach, and all the internal organs depend on nerves and masses of nerve cells.

There are masses of nerve cells in different parts of the body, so that the nervous impulses do not always have to go to the brain. But nervous impulses for breathing and the beating of the heart travel to the hind brain.

With all of this work done for us, we still train our nervous system in much of its action. Some of us act on any impulse that comes to our minds without checking ourselves or waiting to decide what is best. But most of us train our nervous system to do certain things in certain ways. Some of us have not trained ourselves to say "no" to impulses that we should not follow. We should learn to make decisions and abide by them.

We should have good habits of work and play, and good health habits. Thus we care for our nervous system, and make it useful to us.

SUPPLEMENTARY READING

Observations about the Nervous Systems of Nature Creatures

Dinosaurs, which, as stated in the reading following lesson VII, are now extinct, had large masses of nerve cells in their bodies, but comparatively small brains.

The special senses of the lower forms of life would be of no service without nerves any more than they would be for man. Insects have tiny nerves attached to the cells of touch and smell.

Gnats that swarm around lights would go directly to the hottest part of it, if they did not have nerve cells that let them feel the heat.



DIAGRAM SHOWING ARRANGEMENT OF NERVOUS SYSTEM

Nearly all creatures of the wild are alert. Their nervous systems keep ready for quick action.

When the hind brain is taken from a pigeon, it cannot control its body or fly well. This shows that the part of the nervous system used in directing movement has been lost. When the front brain is taken or injured so that it does not function well, it shows no signs of fear and is no longer alert.

A dog that was given alcohol regularly lost its ability to do tricks, and it was no longer intelligent or showed lovable qualities. Its brain and nervous system had been harmed.

QUESTIONS

1. Name several ways in which our nervous system is important to us.
2. Tell how you sometimes obey and sometimes refuse to obey what you have an impulse to do.
3. What signs have you that your nervous system is well cared for?
4. What training do you give it because of your habits and your ways of doing things?

XXIII. THE BRAIN

We want a good brain as much as we do good bodies. Sometimes we do not know that this is one of the things we desire. Many people are unhappy because they have let their brains be idle, and they do not know what is the matter. We have seen how unhappy Helen Keller was when she could not learn things of the world about her.

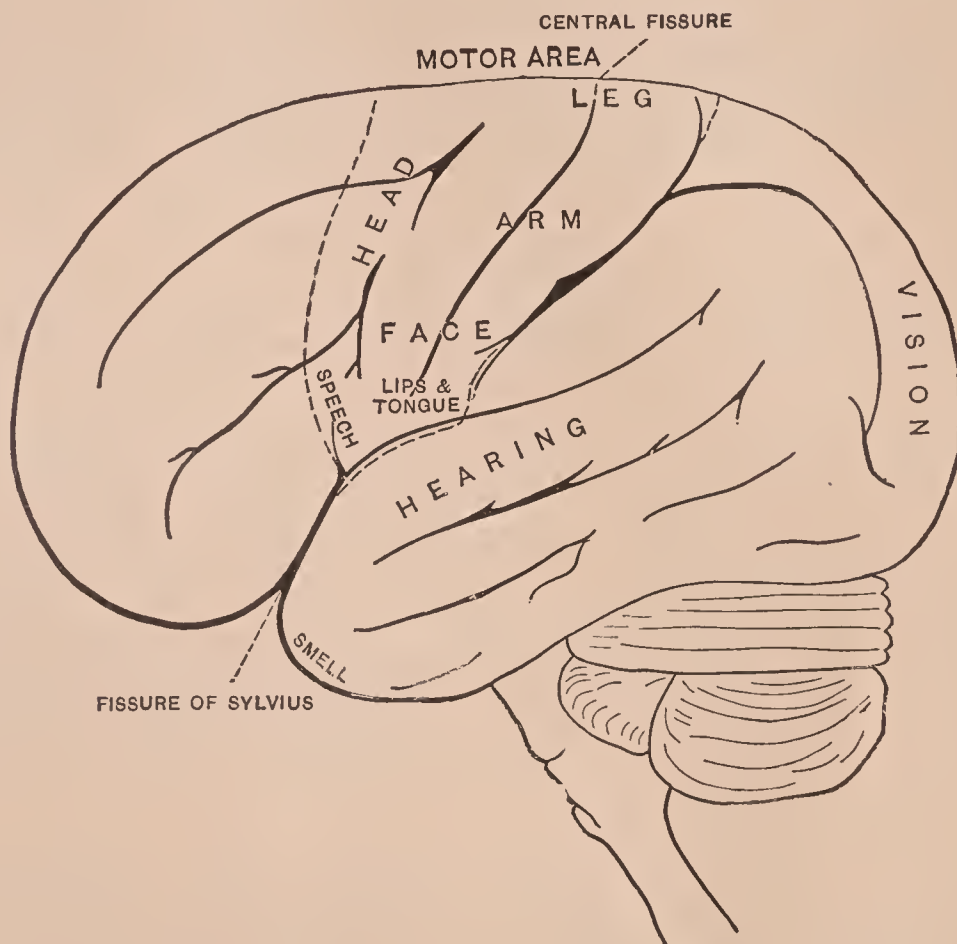
We know that the purpose of large parts of the brain surface is to let us learn through the special sense organs. There is also a portion which lets us learn through doing things with our muscles. Our brain lets us think. With it we imagine and plan. Because of it we use will power. Through it we gain good sense. When we have sense and use it, we are not likely to let feelings of jealousy and hatred master us. There are many reasons why we should desire a good brain.

We want a brain that lets us think well. We learn to think through doing things and thinking as we do them. We learn to think when we study and when we play a hard game. We learn to think in planting and growing a garden intelligently.

Through what goes on in our brain we gain our likes and dislikes. When we taste food it is really our brain that tells us whether we like it or not. It gives us our feelings about what we see and hear and touch and smell. Because of it we know that sunshine makes us happy and that the

spirit of Christmas gladdens us. The love and kindness we feel and our desire to excel and to win come from what has taken place in our brain.

Our brain grows, but not as the rest of the body does. Our bodies become bigger because the number of tiny



LOCATION OF BRAIN FUNCTIONS

cells that make up each part increase. Our brain is made up of tiny cells too, but we have when we are born all the brain or nerve cells we can ever have.

Though the number of nerve cells remains the same, their branches, called *dendrites*, grow and increase in number. When we smell honeysuckle for the first time,

a group of brain cells receives the sensation of this odor. These cells tell us that it is not anything we know. Some one informs us it is honeysuckle. The next time we are near honeysuckle we recognize it. Soon we think of the word "honeysuckle" as soon as we catch the fragrance of this flower. During this experience branches of nerve cells have made new connections. They have grown a little.

Our brain needs food as do the other parts of our bodies. The blood stream carries food to both brain and muscles. When muscles or stomach need most of the blood, it is not a good time to study.

The brain cells that let us learn and do things must have sleep. We should not study or use the brain for any one purpose too long. But we should work at a thing long enough to accomplish something, for that is how our brain is exercised. It is how the dendrites grow.

We may train our brain as long as we live, but the training we give it when we are growing is worth most to us. We can have a good brain by using it to learn about the world around us; by thinking about what we read, and how we do things. A good brain helps us to be happy now and all the rest of our lives.

SUPPLEMENTARY READING

How Sleep Helps Us to Remember

When the writer's sister was a girl in the public schools, she enjoyed learning poems and even prose. She sometimes memorized a long poem in less than an hour. When she knew the poem

except for remembering how the hard parts connected, she would do something to help her remember that. If she learned a poem in the morning, she could not trust herself to recite it that afternoon, but the next day, even though she had not studied or repeated it any more, she was sure to say it without a mistake.

Can you guess why?

While she was learning the poem the nerve cells and dendrites grew tired. They did not fully rest until after a good night's sleep. The next day when they were rested, it was easy for her to repeat the poem.

"We Learn to Skate in Summer and Swim in Winter"

The writer knows a school girl who has experiences in solving reasoning problems in arithmetic very like that in the memorizing described above. This girl is much interested in such problems and is able to solve very hard ones. She often finds that after she has worked hard on a problem — at different times during one day or more, and no longer has any new ideas on it — she can leave it alone for a day or several days, become thoroughly rested, and then solve it.

Her experience seems to come under the law that a famous student of the mind, Professor William James, has stated in this way, "We learn to skate (ice skating) in summer, and to swim in winter." What this means for the brain and nervous systems is easily said. During the winter, when practicing to learn to skate new nerve paths are made to control the new movements that the body must make. Then during summer when there is no ice to skate on, the new nerve paths are not lost. After the long rest, it is easier to skate than before. By this we learn that we do not waste our effort when we try to do something. Some time later we may succeed and the earlier efforts have helped us to do it.

Indications that Lower Animals Learn by Remembering What they have Experienced

A bird returning to its nest noticed a strange object in the surroundings. It had remembered the surroundings sufficiently to know there was a change.

If eggs of another kind of bird are put into a bird's nest, it often will leave it.

A wolf remembers the smell of a place so well that if another odor has been left there he knows it.

The Baltimore oriole uses grays and whites in making its nest. When many colored yarns were placed where one of these birds could use them, it selected gray and white and left the bright colors.

Trappers know that animals frequently become very wary after a few attempts to catch them have been made.

Almost any wild creature will be concerned on hearing a strange sound. Once it discovers what it is or that it is not harmful, it is usually no longer aroused by it.

QUESTIONS

1. Can you explain any experience when you felt glad that you had a brain?
2. Explain why Helen Keller was unable to learn about the world for so long.
3. What makes us learn to think?
4. How does the brain grow?
5. Tell what the supplementary readings mean to you.
6. Apply the meaning to yourself in learning to do things and see what value it is.

XXIV. "MY MIND TO ME A KINGDOM IS"

We like to use our imagination when we read. We like to think of the description of Tom Thumb's dress:

"An oak's leaf he wore for a crown,
His shirt was made of thistle down,
His vest was of web that spiders spin,
His suit was made of butterfly wing,
His stockings were of gossamer, they tie
With eyelash picked from his mother's eye.
His shoes were made of squirrels' skin,
Nicely tanned, the hair within."

Our imagination keeps us interested in things. When we have read a poem we keep trying to get clear pictures of its meaning in our minds. In "The Little Sandpiper and I" we find "sullen cloud," and at once our imagination goes to work to picture what a *sullen* cloud is.

We learn to be a good ball player by picturing in our minds how we should play and then practicing to play that way.

Do you know what day dreaming is? It is to imagine things as happening that have not and probably will never come true. A little day dreaming is good for us. But it is best to use our imagination in doing things. We should see in our mind's eye the action in stories and the pictures in poems. We should plan gardens and then make them. We should make a drawing of a dress or a table or something we would like to make. We should use



J. G. Brown

THE STORM

What does your imagination tell you?

our hands along with our imagination as often as we can. We make our minds rich by what we put in them, and we must keep our imagination active to do this.

SUPPLEMENTARY READING

What a Poet Wants in the Kingdom of His Mind

Henry van Dyke has written these lines in a long poem called, "God of the Open Air":

"These are the gifts I ask
 Of thee, O Spirit Serene:
 Strength for the daily task,
 Courage to face the road,
 Good cheer to help us bear the traveler's load,
 And for the hours of rest that come between
 An inward joy in all things heard and seen.
 These are the sins I feign
 Would have Thee take away:
 Malice and cold disdain,
 Hot anger, sullen hate,
 Scorn of the lowly, envy of the great,
 And discontent that casts a shadow gray,
 On all the brightness of the common day.
 These are the things I prize
 And hold of dearest worth:
 Light of the sapphire skies,
 Peace of the silent hills,
 Shelter of forests, comforts of the grass,
 Music of birds, murmurs of rills,
 Shadows of clouds that swiftly pass,
 And after showers
 The smell of flowers,
 And of the good brown earth, —
 And best of all along the way, friendship and mirth."

Signs of Intelligence among Birds and Beasts

One must be a naturalist as Roosevelt was, or a careful scientist as the men are who have given many of the facts about nature creatures for this book, and spend years observing and studying, before he can have an understanding of the animal mind. It seems to take forethought on the part of the caterpillar to fasten its cocoon, yet we know that it is done because all of its kind do it by instinct. The opossum is on the whole a stupid animal. Yet it knows how to pose as being dead when in close danger. This is largely instinct and but little intelligence. But scientists and close observers of animal life find that animals sometimes think things out, or seem to do so.

In one of the animal buildings at the National Zoölogical Park, Washington, D. C., a carpenter was working standing on a platform well toward the ceiling. A chimpanzee was a little below him looking on at every movement made. The carpenter dropped a glove to the ground floor and that creature went directly after it and brought it to him.

The wolf is notorious for its ability to escape all sorts of devices used by those hunting it. Several trappers and hunters seeking one wolf for several weeks, failed to find him, though the animal was known to be in the region where they sought for it. It somehow discovered a way to escape every scheme laid for it.

A Baltimore oriole fastened its nest to two parallel branches of a limb instead of at the fork of a branch as is the usual way. A storm came and one of the branches sagged so that the nest was not held properly. The bird fastened a string around the sagging branch, and then fastened it to a branch above, making the nest safe as before the storm.

The 4-H Clubs

The boys and girls of the 4-H Clubs have before them a happy road, because it is the road of growth, and growth is the first need

of both mind and body. The 4-H's mean *head* for clearer thinking, *heart* for greater loyalty, *hands* for larger service, and *health* for better living. This likewise is the road to the Kingdom of the Mind.

QUESTIONS

1. Does the picture on page 115 give you a story? What is it?
2. Describe an instance when your imagination proved most useful to you.
3. How many different ways of using the imagination are named in the lesson?
4. Name several things that you enjoy doing and see what part your mind plays in doing each.
5. How do we train our imaginations?
6. What do we do because our minds grow hungry?
7. How may we improve our minds?
8. Make a list of all the poet asks to have.
9. Why does he want strength? courage? good cheer?
10. How many things does he prize and hold of dearest worth?
11. What do you prize other than what the poet has mentioned?

XXV. HOW WE FORM HABITS

Our nervous system helps us to form habits. Have you noticed how a small child keeps saying a word it has heard over and over again like a bird singing its song? Have you noticed in marching that when you are once in step you keep in step easily? *To keep repeating what we do is the way to teach the nervous system.*

When you get up in the morning you see your shoes and put them on without thinking much about what you are doing. Morning after morning you have put on your shoes since you learned how to dress yourself. When on a certain occasion we do a certain thing, we are likely to do the same thing each time we have the occasion to do it. When we always do this same thing we have a habit. Such habits save us time. We should do as much by habit as we can. Do you know how much you do by habit?

Some wise people have discovered the habit law. It tells us how to form habits. Here it is:

1. Learn how to do a thing and do it.
2. Each time you repeat do it as before.
3. Every time the occasion comes for you to do the thing, do it.

Trace a habit you have formed to its beginning and see if you can tell how you formed it.

Have you ever thought how wonderful it is that your nervous system will let you form habits? If it did not,

we should spend nearly all day dressing ourselves, eating, and getting ready for bed again. We should not be able to write a composition without thinking of each word as we wrote it. We should never learn our number tables well enough to be promoted in arithmetic.

SUPPLEMENTARY READING

A Boy Discovers the Great Law in Forming Habits

Ned was fourteen years old, and a member of the school basketball team and garden club. No one among his circle was as busy doing things as he. But it was his way to be hoeing in the garden when the ball team practiced, or else studying his lessons before sundown and working in the garden at dusk. He was always behind time, though always in a hurry. Always blaming himself, yet persisting and trying again.

A county agricultural agent came to live in his home. It took this trained man only a little while to discover Ned's fault. He did not say what he thought aloud, because he knew something better to do. He wrote down everything Ned did for two days. Then he made out a program for Ned to follow in doing his work. On the third day he said, "Ned, let's see how it would be to follow this program," and gave him a piece of paper on which was written a set time for doing everything. For two months Ned followed the plans made by his new friend. Sometimes it was annoying to have to do each thing as it was due to be done. But that was the rule of the game, as his leader explained. Then it became easy to do. By never failing once for a long while to do his tasks promptly, he had a new habit of work altogether.

Animals Learn Habits

Farm animals soon learn to come at regular feeding time to the place where they are fed. It is by habits that most animals

learn tricks. The trainer teaches an animal to do a certain thing on a certain occasion. When he wants it to do the trick he makes the occasion the same as before, and soon it does it by habit. At the circus is frequently a pony that will paw so many times for *no* and so many for *yes*. The trainer gives it a signal that it understands. It is usually one the onlookers do not observe.

But not all animals can be trained to such habits, for that is what the tricks they do are. Animal trainers in selecting animals for training try to find those that will give attention. If they cannot get this, their efforts are usually wasted.

Because of fear, an animal may not learn new habits. At the National Zoölogical Park in Washington, D. C., there is a hyena that has for two years refused to go out into the yard behind its stall. The yard is for its use only and has a high fence around it. Once the keeper put it out, but that did not convince the hyena that going into the yard was the thing to do. It has never of its own accord ventured out. As one passes around this building he may notice the plot of ground around its home is covered with high grass and the rest of the yards are worn bare. Whether it fears a trap or something else no one knows.

Habit and instinct make up nearly the whole life of the animal. It learns a new habit by giving attention and doing a thing often, just as people do.

QUESTIONS

1. Is it natural for us to form habits? Why?
2. What is the habit law? Give an example showing its use.
3. What is a habit?
4. Name each part of the habit law.
5. How do you learn to spell by the habit law? Can you state this law as it applies in making number tables into habits?
6. Does the habit law require us to practice? When we practice doing what we have done before what care should we take?
7. When do we do a thing by habit?

XXVI. SEVEN IMPORTANT HABITS

This lesson is not on habits of the body. It is on habits that become a part of our nature. Here are seven important ones:

1. Courage.
2. Helpfulness to others.
3. Thrift.
4. Industry.
5. Honesty.
6. Cheerfulness.
7. Trustworthiness.

Sometimes we speak of these as qualities of our nature or qualities of character. The following illustrations tell what such qualities let us do:

A boy was lost in a snowstorm. He became so cold that his legs and feet were stiff and numb. He wanted to lie down in the snow and give up. But he kept searching for shelter. At last he found it. His courage saved him.

A girl grew a garden, and then gave her mother all the vegetables she wanted for the family table. That was helpfulness.

She canned what remained and marketed them. The money was saved for something she needed. That was thrift.

A boy who delivers morning newspapers gets up every morning at half-past four and at five o'clock begins his

work. This is industry. (Of course, it is not necessary for every one to begin work so early in order to be industrious.)

A groceryman was forgetting to charge for one article a girl had bought. She pulled the article from the bag to show it to him. Her honesty made her do it.

A woman, who, on limited means, must provide for several small children, takes the greatest care to spend every cent wisely. No time is wasted worrying over the lack of luxuries. Although they are very poor, they are cheerful, for they make the most of what they have. That is the best kind of cheer. Another woman who also has limited means, and children to care for, does not spend wisely. She and her children buy luxuries one week and the next week have nothing left to live on. Accordingly they are cheerful at one time and despondent and full of worry at another. They have not learned the best way to have real cheer.

A boy was taking a telegram to the station for a neighbor. As he passed along the street he saw a wrestling match. He wanted to stop and watch it. But his neighbor wanted the telegram to go at once. The boy did not stop. He was trustworthy.

The qualities that become fixed in our natures are the ones we keep practicing. We make them habits.

Our natures hunger for exercise as our bodies do. An honest man likes to be honest when circumstances tempt to dishonesty. An athlete once said that he liked to make his nature do things just as he did his body. In jumping

he made his body turn as he wanted it to while he was in the air. But if he lost the contest he cheered and applauded the winner joyfully. His nature is as finely exercised as his body.

The seven habits named above will give us natures we can trust. We can develop these qualities by using them every time we have a chance. We show our honesty in a ball game. We show courage and cheerfulness there too. Every day we use some of these qualities in one way or another.

SUPPLEMENTARY READING

Why We Like the Story of "Honest Abe"

There is a story — a true one — told of how, early in his life, Lincoln came to be known as "Honest Abe."

While clerking at Offut's store at New Salem, Illinois, he sold a woman a bill of goods amounting in value by the reckoning to two dollars, six and a quarter cents. Before leaving the store that evening Lincoln discovered that he had taken six cents too much. He closed the store and in the dark started out on foot a distance of two or three miles to the house of the customer and gave her the sum owed.

If he had waited to return the money until the customer came again, no "Honest Abe" story would have come from the incident, for it would not have shown how his ideal for being honest would not let him wait.

One Dollar Saved Each Week

A man when his first child was born put one dollar in a bank to be saved for his young son. Some one said, "And you will do this every week?" He answered, "Yes," though he hardly saw

how he could do it. That "Yes" made him determined to save the dollar the next week. He did! At last it became easier to save it. Then another child came, and in a few years another. The man could not then save a dollar for each of these, but he kept on saving the one dollar.

As the years passed the family had more means, but this one dollar was still put in the bank apart from the other money.

When each child was twenty-one years of age, each received \$500 from the dollar-a-week savings. Though the family had some wealth, it happened that this savings account was the only ready money they had to give each son when he became twenty-one.

The father says that his plan was the best medicine his mind could have. That one habit made him feel thrifty and respectable.

QUESTIONS

1. What habits are listed in the lesson?
2. Name some ways for a child to be thrifty.
3. One of the scout laws is that one shall be trustworthy. Show what that means.
4. How do we build honesty and other qualities into our nature?
5. Tell in your own words why we like the "Honest Abe" story.
6. Saving a dollar a week, how much money did the father have from the account after twenty-one years? The second child was four years younger than the first. How much money from the \$1.00 a week savings was there when he became twenty-one? The third child was four years younger than the second. How much money was there when he was twenty-one?
7. The money had been drawing interest, compounded yearly. Have an eighth-grade pupil figure out what the father had left after he had given the third son his \$500.

XXVII. WHY GROWING BOYS AND GIRLS SHOULD NOT SMOKE TOBACCO OR USE TEA OR COFFEE

While our bodies are growing they do double work. They keep themselves in repair and get bigger too. This is made harder because the parts do not all grow big together. For example, the heart grows fast at one time, and its arteries at another. Our nervous system is taxed to keep things going right.

While our bodies are growing in this way, they are easily harmed. Some organs are easily overworked. All the parts are tender. It is easy to harm our growing bodies. We harm them by work that is too heavy. We harm them by sleeping too little. We injure them greatly from the drugs in tobacco, tea, and coffee. What might do little harm when our bodies are full grown and have gained their strength, does much harm while they are growing. Nerve cells, especially the nerve cells of the brain, are poisoned by the nicotine in tobacco. Many of the organs of the body are harmed by this poison. But the brain is likely to be injured most of all.

We can not know how great the damage will be from smoking habits formed while we are yet growing. We can not know how much harm may come from drinking tea and coffee. If our nervous system is excitable, coffee and tea have a chance to cause much harm. We can not tell how strong our desire for any of these may become.

We take a risk that we can not measure when we teach our growing bodies to want to smoke, or to drink coffee, and tea.

We do not want to burden our bodies with poisons. We do not want them to have strong desires for what is harmful to their best growth. We do not want to spoil the sleep and rest and activity they need. We can save them from these dangers by letting tobacco, tea, and coffee alone — all the years our bodies are growing and gaining their strength.

SUPPLEMENTARY READING

Something to Think About

1. In six American colleges, the smoker and the non-smoker have been compared, to see which passes best the test for joining the football teams. To make a football team, a man must show that he can play football well. It has been found that men who smoke are about half as likely to pass the test as the men who do not smoke.

2. In the same six American colleges it was found that the lungs of the men who smoke cannot breathe as much air as the lungs of the men who do not smoke.

3. In twelve American colleges the smokers and non-smokers have been compared to see how well they learn. It has been found that there are more low grades among smokers than among non-smokers.

Tiny Dogs for Sale

A man living in Paris, France, who raised and sold dogs, found that the small dog was more in demand than dogs of normal size. Soon he had very tiny dogs for his customers, who paid him high prices for them. To one inquiring how he grew the dwarfs he con-

fided his secret. "You see I put a little speck of nicotine in their food when they are quite young. Then I put in a little more, and then they never get big."

The customers did not know of the little dogs who were killed by this poison, nor those sickly and unfit to sell. They only saw the dogs which had been strong enough to survive and appear well, but without their normal growth.

QUESTIONS

1. Why do our body-machines have more work to do while we are growing?
2. Do all parts of the body grow evenly? Give an example to illustrate your answer.
3. Why are poisons so bad for us while we are growing?
4. How do we form habits of smoking? of drinking tea or coffee?
5. How may such habits harm us? What are special dangers in forming such habits?
6. What harm may one expect from tobacco smoking?
7. What kind of nervous system should not have tea or coffee?
8. What does the supplementary reading called "Something to Think About" make you think?

XXVIII. SAFETY FIRST

Have you not seen the "Safety First" sign? Throughout the nation its appeal has gone. It is to remind people that they should take care and prevent accidents.

Do you know there are hundreds of lives lost and thousands made cripples each year by accidents?

Many of these can be prevented. People need not light matches near a leaky gas pipe, or keep poisons in unlabeled bottles where they will be mistaken for medicine, or leave rubbish in the basement which may catch fire, or drive automobiles carelessly, or cross railroad tracks and electric car tracks without looking and listening, or put their hands on electric wires, or step from street cars while they are moving, or do many other things without giving attention.

People should be thoughtful for the safety of others. An engineer in charge of the building of a bridge and engineers running a locomotive should keep everything safe for the workmen and for the public. Dairymen should not let milk be sold from diseased cows. Health officers should test, from time to time, milk sold to the public to see that it is safe.

Children should be thoughtful for their own safety. Children playing on the streets or walking to and from school should be on the lookout for vehicles, especially those coming from alleys and unexpected places. When

playing in open fields and vacant lots they should remove sharp sticks that might fly up, boards with nails in them, and sharp stones on which they might step or fall.

In our world with its many inventions, its factories, and cities and towns, accidents will occur often unless every one helps to prevent them. But if we all help, there will not be nearly so many.

It is not natural for us to be on the lookout for these dangers. They are not natural dangers. Therefore we have to teach ourselves to be careful.

How different it is with birds and animals. Their dangers are natural ones, and by instinct they are all the time trying to escape them. A bird builds its nest where its enemies can not destroy it, or else it stands by ready to protect it. Nature often gives animals a coloring that protects them against enemies. The New England hare has a brownish fur in summer and a white fur in winter.

Civilized man no longer has natural enemies as the wild life has. But he finds dangers from his own handiwork. Nature does not protect him from these. He must train himself to be careful.

SUPPLEMENTARY READING

A Few Illustrations of Safety First in the Nature World

Among Worms and Moths

The caterpillar with a green coloring so like its surroundings is very much liked by birds. But birds do not find it easily. The caterpillar whose body has rich bands of red and black does not need protective coloring, for birds and insect-eating creatures do not like it.

The puss moth protects itself against flies that would lay their eggs on its body. It throws out a poison that kills them.

Among Birds

Let a canoe approach a wild duck and her young, and the young ducks will go swiftly away, at right angles to the direction of the boat, while the mother duck will swim and flap her wings alongside or a little in front of the boat until the young are quite safe. Then she will herself escape.

The weaver bird builds its nest far out on a limb and usually over a body of water. It covers the nest over and then builds a long neck extending out beyond the reach of a monkey. It enters the nest through this neck.

A grouse hen and her young have coloring so much like their surroundings that if one loses sight of them for a minute, he is not likely to find them.

When the eggs of a water rail were hatching, a man with the kindest intentions threw parts of the shells from the nest while the mother water rail was away. When she returned she feared danger and did not rest until one by one she had removed birds and eggs.

Little birds in their nest will stop their *chirp, chirp, chirp*, if they hear the parent bird give a note of warning. They have never experienced the danger, so they do it by instinct.

Among Animals

It is commonly observed how the opossum pretends he is dead when in the presence of an enemy from which he cannot at once escape.

The American wooly opossum carries her young on her back. Her tail is arched up and each baby opossum curls its tail around the mother's tail. She walks out on the limb of a tree bearing this burden.

The coloration of animals like that of birds protects them. A

deer can hardly be seen in its natural haunts. The chipmunk living in the "bad lands" of South Dakota where the plant growth is sparse is of a light yellowish color. The same kind of chipmunk living in the heavily wooded sections of northern Wisconsin wears dark brown colors. In Montana where the vegetation is neither so sparse as in South Dakota nor so heavily wooded as northern Wisconsin, its coloring is between the light and the dark described above.

The rabbit's sense of hearing lets him know of danger. This is true of the deer too.

Safety Essay

By STANLEY NEWCOMB, San Diego, California,
Pupil and Boy Scout, Best out of 400,000.¹

An essay by Stanley Newcomb, 14-year-old San Diego, California, school boy and Boy Scout, was chosen as the best of more than 400,000 submitted by elementary school pupils in a national safety essay contest conducted by the Highway Education Board. Stanley Newcomb's essay follows:

How I Can Make the Highways More Safe

Mars, the mythical God of War, has until recently been regarded as the foremost aid to the grim reaper, "Death." It is generally conceded that the results of his activities are now surpassed by the increasing and alarming toll of life caused by automobile accidents.

People throughout the land are awaking to the fact that we are facing a great national problem. "What I can Do to Make the Highways More Safe" is a subject which should receive serious consideration by every one. Applied personally, I am such a small speck of humanity in this great world that at first it seems presumptuous to imagine that I can be of assistance, but on further

¹ By courtesy of Mr. Stephen James, Highway Education Board, Willard Building, Washington, D. C.

consideration it occurs to me that if all the little specks, children from coast to coast, will earnestly discuss the matter with their parents, teachers and companions, and will take the precautionary measures to prevent accidents, it will greatly aid in decreasing the number of automobile injuries and fatalities.

Each year statistics are compiled, comparing the number of deaths from automobile accidents in ratio with the population of each city and town. Every death occurring in our city as a result of an automobile accident brings us that much higher on the "horror list." We do not want our city or "home town" pointed out as a place where there is no respect for law or traffic rules, where the people do not use common sense to safeguard themselves and others from untimely and terrible death.

To do my bit I therefore resolve to offer my assistance whenever I see a small child, or an aged, blind or feeble person hesitatingly attempt to cross a street or highway. I will also take necessary precautions at all times for my own safety, and will caution my companions, whenever the opportunity presents itself, as follows:

Do not cross the street in the middle of the block, nor cut obliquely across a thoroughfare. Cross only at the corners and then at right angles.

At the intersection of two streets, look not only to the right and left of the street you are crossing, but watch for approaching vehicles coming around the corner from the intersecting street.

Never step out from behind a street car or a vehicle that has passed until you have glanced in each direction to see that the path you are about to cross is clear. Also, in alighting from street cars look to the right and left before proceeding to the curb.

When about to cross a thoroughfare do not mentally estimate your rate of speed in comparison with that of an oncoming vehicle, and take a chance on crossing before it reaches you.

Do not play football, marbles, or use roller skates or coasters on the streets or highways.

When riding bicycles give necessary hand signals to advise auto-

ists behind you of your intention to turn corners or slow down and do not hang on to street cars or motor vehicles.

When hiking on country highways keep on the left of the road as near to the right edge as possible. Keep your ears trained to hear any warning "honks" behind you.

When nearing street car or railroad crossings in automobiles, on bicycles, or on foot, do not laugh or engage in loud conversation, making the approach of an oncoming car or train inaudible.

In short, "Never take a chance; be sure you're safe, then go ahead."

Helps in Learning Safety First

1. When a stairway is steep, a floor polished, a piece of ground slippery — notice these facts, and take care.

2. When using machinery keep arms and legs from getting too near. Keep the head away.

3. Have proper habits as regards street crossings and railway tracks. Keep hands and feet from electric wires.

4. In using tools be careful.

5. Have caution when using matches and do not strike them where there is gas, gasoline or other easily inflammable substance.

6. Learn how to send in a fire alarm at the fire alarm box and by telephone. Practice in an imaginary way until you are sure you will make no mistake.

7. Be willing to obey orders exactly and at once in a fire drill. That is what makes them valuable. If there is a fire, obey as before. That is how your own life and the lives of your companions will be saved.

8. Be sure that bottles containing poisons are marked and put out of the way.

9. Blow out a lamp when it is no longer needed. Do not turn it down and leave it so.

10. Be careful of fire when using candles and keep fire away from kerosene or gas. Use kindling to start a fire — not kerosene.

11. Do not shoot unloaded guns ever — for they are frequently not unloaded but loaded.

12. Find the Safety First care that you should take and be as perfect in it as possible.

QUESTIONS

1. Mention accidents that commonly occur around you and which could be prevented.

2. Mention others that occur less frequently.

3. Name all the precautions for public safety you find in your community.

4. Name precautions you take.

5. Describe some Safety First habits.

6. Tell of situations where one's own safety is in the hands of others.

7. When is the safety of others in your hands?

XXIX. FIRST AID

First Aid is the care given to the injured before the services of a doctor may be had.

In our study we have discovered over and over again that we can learn to do things, and that we can have good bodies. We do not want these just to be happy ourselves, but so that we can be helpful to others as well. We should be a good neighbor and a helpful companion in a case of emergency.

We can not be helpful by just wishing to be. When one is injured we are helpful if we know how to do the right thing. We should know how to do the right thing in the right way.

Doctors have learned what is best to do when a person is shocked, when he faints, when he has been near drowning, or has been poisoned. They have learned that pus and inflammation around wounds comes from microbes which have got into the open cut. They have found how best to keep these dangerous microbes away.

Many things have been discovered in the science of medicine about the care of the injured. A doctor can not always be secured immediately. We must therefore learn to give service, for we do not want to be sympathetic and yet not be able to do the right thing.

We can not learn First Aid without practice. We can not learn it from reading in a book. We must practice

what we read in make-believe cases until we are sure we know how to do the right thing. We can not learn all of First Aid until we are older. In the Appendix of the next higher book in this series are First Aid Practices to learn. We should practice them. Unless we do, we may harm some one in trying to help him.

SUPPLEMENTARY READING

How First Aid as It Is Known To-day Began

A little more than seventy years ago, when Florence Nightingale was a young woman thirty years old, a trained nurse informed on the proper care of a patient was hardly to be thought of. Miss Nightingale wanted to be a nurse like the best nurses of to-day.

What put the idea into her head, her family and friends could not imagine. Indeed, they only thought of the unclean ignorant nurses that they knew. The idea was really put into her heart first, for in visiting a London hospital for soldiers she had been greatly aroused by the sight of the dirty surroundings and unwholesome care.

There was a school in Germany where women could receive training as nurses. It was an orphan asylum, a penitentiary, a school for teachers, and a small hospital. Here Miss Nightingale studied. Later she assisted in caring for orphans among the poor of Paris, and received further training by nursing in hospitals. Then she returned to London and was in charge of a hospital for women.

Because her family was wealthy and had a wide acquaintance, her new field of work was noticed more than it might have been otherwise. Even so, no one knew what great power lay within her. Soon all of England learned this.

The Crimean war came. France, England, and Turkey fought against Russia. News reached London that in one place two thousand wounded men were in hospitals not prepared to care for

them. Reports said that wounded lay for a week midst mud and filth without even having a first dressing and having only stew to eat. These reports stirred all England.

Florence Nightingale, with a group of women from her hospital, was sent to Crimea. Gradually the conditions improved. Men lay between clean sheets. They wore fresh clothes and ate good food.

After the day's work was over Miss Nightingale wrote letters and reports in which she told what should be done. Her writings helped her to gain support for her cause, among people who could help.

It was a person inspired by her work who thought of the idea that gave rise to the Red Cross in Europe. Later, Clara Barton, one of the women who had served the wounded in our Civil War, went to Europe and brought back information about the Red Cross, and so the American Red Cross came into being with Miss Barton as its first president.

We cannot make our story longer here and tell more about how our modern hospitals, and modern nurses, have attained what Florence Nightingale hoped for. She has left her spirit of love and desire for the best. Discoveries in the sciences of surgery, medicine and cookery have made it possible to have the best.

Each person in learning First Aid and home care of the sick helps to bring the best to everybody. The dream of Florence Nightingale lives on.

A National Contest in First Aid

In 1915, sixty-eight First Aid teams representing mining companies from all parts of the United States and Mexico met at Denver, Colorado. Each team consisted of six men, including a captain and some one to act as patient.

The contests in First Aid continued during two days. Each team tried to win in doing most wisely, quickest and best the thing told to do. There were judges to decide the winners.

In the artificial breathing contest eight teams were perfect in choosing what to do and in doing it quickly and correctly, and all the teams made above ninety on this. In mines it is not in cases of drowning that artificial breathing is needed but for miners overcome by gas. So the patients in this contest were in make-believe, unconscious from inhaling gas. In all the other contests there were winning teams for first, second and third places. But excepting these first places sometimes as many as twenty teams tied. They were all expert for they had usually won in the contests held among the mines of their state before they tried in the national contests.

The men making up the teams were miners who after they had learned First Aid had kept in practice exactly as baseball players do. They received no pay for this, but their expert ability in First Aid let them protect the lives of their fellow workers and that is their reward.

In the contests the teams lose points when a bandage is too tight or too loose or in the wrong place or put on too slowly. They lose points for failing to treat for shock and for all the mistakes they make.

These contestants and others will soon meet in another contest to be held in St. Louis. As these pages are being written, forty First Aid teams from mining companies in Virginia are holding contests to see who shall go to St. Louis. Is it not an interesting way to keep First Aid treatment at its best?

Life-saving Service

Each year the Government of our country publishes a report of the rescue work done by the Life-saving Service of the United States.

In stations and lighthouses placed along our seacoasts and lakes life-saving crews are found. Many of these men serve for years, and risk their lives in rescuing others again and again, for no matter how carefully they keep prepared, now and then they find it necessary to do what is of great danger. They do it.

Life-saving crews do not wait idly for occasions to save lives. In the life saving along our coast the crews must keep in training to meet different emergencies. There are wrecked ships and boats to pull in as well as persons to save from drowning. They must know rescue work as a doctor knows his line of business.

Naturally many letters of thanks are received at the Washington Headquarters for the services these men render. One such letter is copied below:

Dear Sir:

A letter of thanks for the services of your life guards at Little Egg Harbor Inlet, New Jersey, on the night of the 11th instant. We left Beachhaven for Atlantic City by inside waterway and just as we were near Great Bay high seas swamped our boat, stopping our engine. We managed to paddle with the crippled boat to a near by island. It was five o'clock in the evening. The wind was very high and the weather bitterly cold. We found some wood and made a fire. The fire attracted the attention of the life-savers of Little Egg Station and they came out at once, finding us nearly frozen. Had they not come when they did, we would have perished that night. There were four of us — the Captain, my wife and child and myself. The life-savers took us to their station, gave us a change of clothing, supper, bed and breakfast. Next morning they took us out and saw us safe across Great Bay.

We want to thank them, through you, for their timely service. They saved four lives that night.

Sincerely yours,

Joe Garttmier.

General Superintendent,¹
Life-saving Service,
Washington, D. C.

¹ From *Annual Report Life-saving Service*, 1914.

It is a rule of the service that no rewards be accepted from the persons whom the life-savers rescue.

Instances of Sympathy and Care Shown Among Nature Creatures

Groos tells in his book, *The Play of Animals*, of a cat that made two trips carrying fish bones from the house to the garden where a stranger cat was, before he ate his own meal.

A pack of wolves hunting food together share what they find.

The dog, when harm comes to his master, frequently goes to others and tries to get them to follow him to the place of trouble.

Ernest Thompson Seton says that an animal in trouble will trust itself to the care of another. He tells of an injured moose coming to a man not at all in the spirit of fight, but as if it sought help.

QUESTIONS

1. Why should we learn First Aid?
2. How do we learn it?
3. What First Aid have you learned at home or elsewhere?
4. What did Florence Nightingale do?
5. How is her work still helping us?
6. What First Aid practice might you use in a contest?
7. How do you feel toward the Life-saving Service as described in your book?
8. Tell of persons you know who have risked great danger in helping others.

XXX. GERM DISEASES AND HOW TO PREVENT THEM

We do not want to make our bodies sound and strong, and then have them all broken up and weakened by diseases. We do not want to lose our lives before we have lived half a lifetime. We do not want our playmates to be harmed by diseases. We want to keep our mothers and fathers. We want small children to be saved from having their tender bodies wrecked by measles, whooping cough, and scarlet fever.

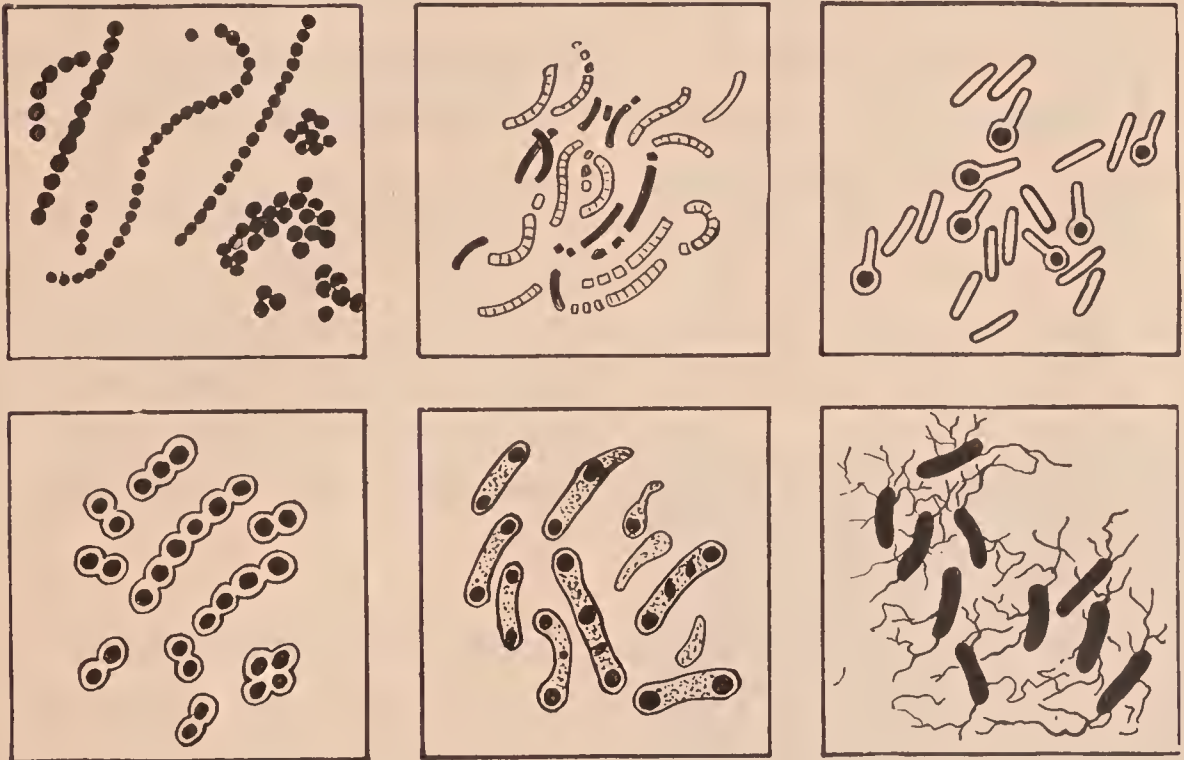
We are glad to know that some germ diseases do not do half the harm they did several years ago. We are glad that these diseases can be prevented. It is good that some one discovered vaccination against small pox, for it is a dreadful disease. It is good that ways of curing tuberculosis have been found. We are glad that since the mosquito carries germs of malaria fever, people know it, for they can destroy the mosquitoes.

It is good to think that scientists have discovered anti-toxin for curing diphtheria, and typhoid vaccine that keeps that fever away. It is good that pasteurizing milk destroys any disease germs it may have, and that water coming from lakes and rivers can be made safe and pure.

We are glad that in the city there can be good sewage pipes which carry away the germs that have come from the bodies of persons having diseases. Sewage and wastes

in town and country should also be taken care of so they will not reach the drinking water and make it unsafe.

We shall be glad when people everywhere have protection from diseases. Everybody should have the



TYPES OF GERMS

From left to right, top row: Pus, Tuberculosis, Tetanus; bottom row: Pneumonia, Diphtheria, Typhoid. — Highly magnified.

opportunity to be vaccinated. Anyone who has diphtheria should be able to get the antitoxin treatment quickly. In our country wherever people live they should have the best of protection against diseases. We will keep our bodies from being wrecked, and many of us will live many years longer if we are protected from germ diseases.

SUPPLEMENTARY READING

Facts about Protection of Animals from Diseases

Gazelles, zebras, and antelopes live in large herds. Lions and leopards hunt these animals and feed on them. The diseased ones are the easiest caught. If it were not for the leopard and the lion, there would be so much disease that it is doubtful whether the herds would continue to exist.

In the same way, herds of buffalo, though preyed upon by the wolf and lion, have been saved by them because the weak and the diseased are most often killed.

Herds of domestic animals such as the cow, pig, and sheep are protected from diseases in a different way. Cattle are tested for tuberculosis and the diseased ones are separated from the others. A vaccine against hog cholera will stop this disease, and on several occasions in our own country it has saved the loss of thousands of hogs. So, too, a vaccine for anthrax has saved large herds of sheep.

Facts about Protection of Plants from Diseases

A few years ago the citrus trees of Florida were about to be destroyed by a germ disease. The growing of the citrus fruit had become an important industry of the state and the loss would be several millions of dollars. Men in the state and men from the U. S. Department of Agriculture kept seeking for a way to stop the disease from spreading. But no one had succeeded. They could not prune out the diseased parts or cut down the trees without spreading the disease germs to other trees.

At last a man from the State Department of Health proposed a plan that proved successful. Dr. Byrd's idea was to burn the diseased twigs and branches. Then no germs reached the healthy trees near them, for the tool used in doing this did not spread the germs to other parts of the tree as happened when they had tried to prune them.

There is a quarantine against bringing into this country certain kinds of European plants and trees that are diseased.

It sometimes happens that the soil of cotton fields gets germs in it that do not let the cotton plants thrive.

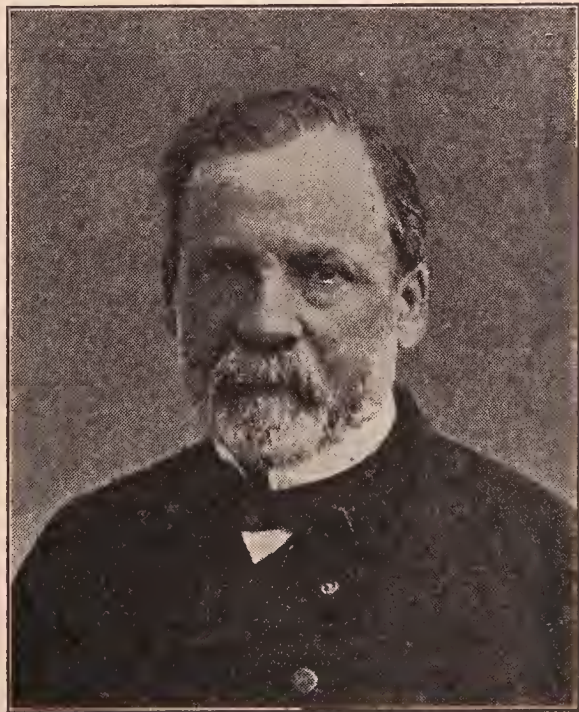
Germs that cause wheat rust live for a time on other plants, get into the soil and later on the growing wheat.

Disease germs in soils and seeds must be considered by the farmer and gardener who want good healthy crops. Much has been learned about protecting crops and fruits from diseases.

Interesting Discoveries and the Benefits They Bring

The Discoveries of Louis Pasteur

Louis Pasteur was a Frenchman, living in France. He did his important work in the last half of the last century (1850-1900). His first work of importance was in studying the fermenting of wine. This covered twenty years. During this time the wine manufacturers and wine merchants of France were not making a success. The wines they shipped away soured and had to be returned to them. Pasteur found living bodies, microbes, in the wine, but he did not say so then. It seemed to him better to wait until he knew how these tiny creatures grew and what their habits were. At last he learned, and what he learned was the secret that saved the wine industry. He found that by controlling the temperature of the wine just right and shutting the air away, it did not sour and could be shipped long distances. The microbes did not grow when this was done.



LOUIS PASTEUR

Now, manufacturers of cheese, butter, and vinegar know how to make large quantities of these products, and keep them the same month after month, because they can control the germs that ripen the cheese, sour the milk, and ferment the liquid for vinegar. Pasteur's study of wine has led to discoveries about making butter, cheese, and vinegar.

His discovery has something to do with a later discovery also. This has to do with the prevention of germ diseases. All that is known about germ diseases has come from the start made by Pasteur.

He observed that people have certain diseases but once. He thought these diseases were caused by living bodies. But he said nothing. Instead his next step was to vaccinate chickens against cholera, and sheep and cattle against a disease called anthrax. He took the cholera germs, heated them to a certain temperature, made a vaccine, and put it into the chickens, and they did not have cholera. Making a vaccine for anthrax was harder, but he succeeded; and thousands of cattle and sheep were saved for the French nation. His thinking about the fact that people have certain diseases but once, had led him to discover vaccines for animal diseases.

When time came for his knowledge to be used in preventing diseases among people, he was most cautious. A mother brought to him a little boy who had been so badly bitten and bruised by a mad dog that it seemed as if he must die. Pasteur had a treatment, and because doctors advised that the boy would surely die if it was not given, he decided to try it. It was done. Pasteur stayed by him day and night, so anxious was he. Time passed. The boy did not go mad, but recovered. Since then all the civilized world uses the Pasteur treatment for mad dog bite.

So great was the ability of Pasteur and so important his discoveries that by many he has been called the greatest man of his century.

The Discoveries of Doctors Laveran and Ross

In 1880 when Pasteur was succeeding in his work, another Frenchman, Laveran by name, discovered that the blood of a malaria patient had millions of germs in it. At first people did not believe this, but several years later when the thought of germs as the cause of disease did not seem so strange, doctors began to believe in Laveran's discovery.

In 1895 Dr. Ross, an Englishman, discovered that the malaria germ goes through certain stages of growth in the mosquito's body, and then gets into the mosquito's mouth and when such mosquitoes bite a person the malaria germ is given with the bite. To test this discovery two Englishmen and an Italian went into a marshy part of Italy where most of the people had malaria. By using screens they lived there all summer without having malaria, though people all around them had the disease. To test the discovery further, an English doctor carried with him to England mosquitoes that had bitten malarial patients in Italy. These were allowed to bite his own son and another man. In a little more than two weeks both took the fever.

These discoveries have proved of the greatest value in many regions of the world. Certain regions of our own country have during the last ten years made great strides in getting rid of malaria. They have discovered how to oil streams and pools of water so that young mosquitoes cannot grow. The United States Public Health Service, the Rockefeller International Health Commission, and many of the State Departments of Health, have made campaigns against the spread of this disease.

History seems to show that malarial fever was one of the causes of the downfall of ancient Greece. It is a terrible disease because people are left pale and weak by it. The discoveries made about the malaria mosquito is a timely one for the present day. But it takes constant effort, where malaria mosquitoes thrive and the disease has a good start, to make much progress in stopping it.

XXXI. GERM DISEASES AND HOW TO PREVENT THEM (*Continued*)

The discoveries made about germs and germ diseases do not by themselves stop the spread of disease. They only help us to know what to do. What each of us does either checks disease or spreads it. We can keep diseases away only by doing the intelligent and the right thing.

We keep ourselves from colds by not letting our bodies get too tired or too chilled or too weak. We keep others from having colds by staying away from them as much as we can when we have a cold, and by catching our sneezes in a handkerchief and not coughing in their faces.

We can help a great deal in stopping the spread of diseases by staying away from school and from other children when we have a sore throat, flushed face, watery eyes, and other signs that indicate a contagious disease. We should not give such diseases to others thoughtlessly, for they frequently do great harm to small children and sometimes to older ones.

People who have certain germ diseases are likely to leave the germs on whatever touches their lips. We should, therefore, be careful. We should not eat at ice-cream fountains or restaurants where the dishes are not scalded after use. We should drink pasteurized milk unless we are sure the other is safe. We should not drink from wells where sewage reaches them, for typhoid fever

spreads that way. As we can not always tell what drainage empties into a shallow well or spring, we should avoid using water from such a source as much as possible.

If we live where there is malarial fever, we should keep mosquitoes from us, and help destroy the pools of water where they grow. If we live where typhoid fever is common, we should keep vaccinated against it.

We should try to stop the great loss and trouble from contagious diseases.

SUPPLEMENTARY READING

Facts about Conditions that Make it Easy for Creatures of the Nature World to Take Disease

A healthy chicken will hardly take anthrax, but if the fowl is made to stand for several hours in cold water, it readily takes it if exposed.

Frogs do not take anthrax easily either, but if kept in a warm place they will take it. Frogs thrive best where it is cool.

Mice also take this disease easily when fatigued but not so ordinarily.

Too much cold, or heat, or fatigue leaves the animals weak and so the disease germs gain a good start.

These results of experiments with animals strengthen the belief that exposure to too much heat or cold, or fatigue causes people to take germ diseases more easily.

“Typhoid” Mary

In studying a group of typhoid cases in Long Island, N. Y., Dr. Soper found in a household a cook named Mary. She had not been in the employ of the family long, and was at the time suspected of being a carrier of typhoid fever. Her history indicated

that wherever she had been, there had followed cases of the fever. The evidence was so strong that when he presented the matter to the New York City health authorities with the information that she was then employed in New York City, the city health department caused her to be taken from her work for examination. She was found to have typhoid fever germs in her body. There were health laws that permitted the health department to detain her. She tried in the courts to secure freedom but was unsuccessful. Finally, on her promise not to engage in cooking as an occupation, she was released on parole.

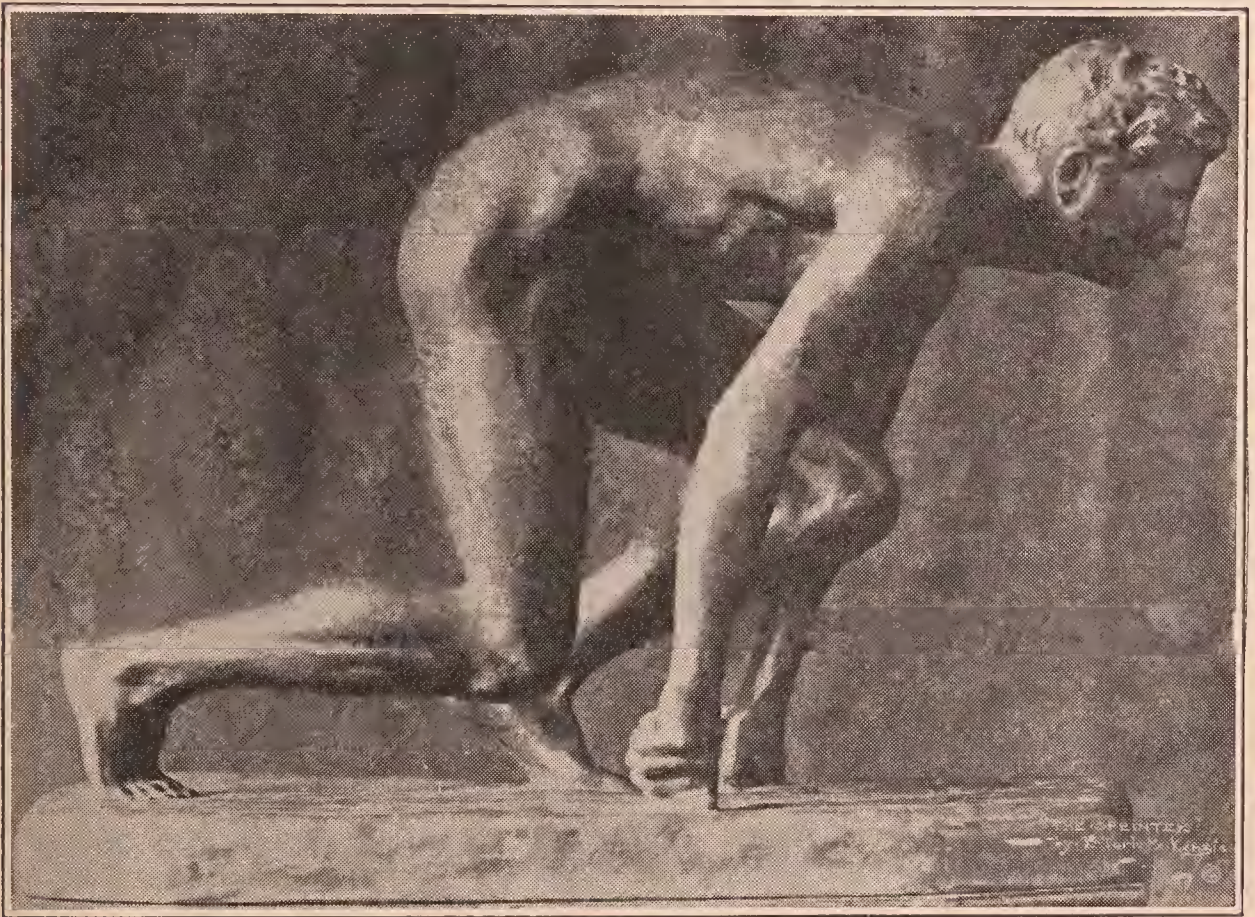
Despite her promise to keep the health authorities informed as to her place of employment, she disappeared from view.

Several years later a group of over twenty cases of typhoid fever occurred at about the same time in the Sloane Hospital for Women, New York City. On investigation it was found that the bacilli had come from eating a dessert prepared by a cook who meantime left the hospital. After some detective work, the cook was finally discovered living in Long Island and proved to be the same cook named Mary who had been paroled by the public health officers. In view of the fact that she had deliberately violated her parole, and that as a cook she was a constant danger to public health, she was ordered into custody again. Repeated examinations showed that she still carried dangerous typhoid germs.

— As reported by Dr. Bolduan, U. S. Public Health Service.

XXXII. WE NEED HEALTH DEPARTMENTS AND HEALTH OFFICERS IN PREVENTING DISEASES

When a disease breaks out, some one must take charge and tell us what to do. Otherwise, we would do ever so many things wrong. We should not know who should



THE MODERN ATHLETE

A statue by the American sculptor, R. Tait McKenzie

be under quarantine, or for how long. There would be no one to trace the way the disease had traveled and so get at its source. We might not know whether the milk

or the water were safe, or whether we should be in school or at home. Too, there would be no one to keep careless persons from doing harm.

We need to have a health officer to protect us and show us how to protect ourselves. He should have intelligent and trained men and women to help him. His department should be equipped so that he can examine for disease germs, keep vaccines or order them, and provide for many kinds of emergencies. He should have nurses on whom he can call for help when there is need.

To prevent diseases from spreading is a business in itself. We should have an able and intelligent health officer at the head of this business. He will be able to prevent diseases before many know they are present, and in a sudden outbreak, he will know how to manage, and stop the trouble quickly. We can not be properly protected from germ diseases without health officers and good health departments.

APPENDIX

GAMES AND OTHER ACTIVITIES

A. ROUGH AND READY GAMES

Chain Tug of War

The two teams form chains by grasping each other around the waist. The two leaders grasp a stick that they hold in a horizontal position parallel to a line on the ground until the signal to start is given. At the signal "GO" the two teams pull until all of the players of one side are pulled across the line.

— Angell's *Play*.

Leapfrog

(2 to 100 players)

The first player makes a back, standing either with his back or his side toward the one who is to leap over. The next player runs, leaps over the back, runs a few steps forward so as to allow space for a run between himself and the first player, and in his turn stoops over and makes a back. This makes two backs. The third player leaps over the first back, runs and leaps over the second, runs a short distance and makes a third back, etc., until all the players are making backs, when the first one down takes his turn at leaping, and so on indefinitely.

Variation: This may be made much more difficult by each player moving only a few feet in advance of the back over which he has leaped, as this will then leave no room for a run between the backs, but means a continuous succession of leaps by the succeeding players.

— Bancroft's *Games for Gymnasium, Home, Playground, and School*.
Copyright by the Macmillan Co.

B. TEAM BALL GAMES

Dodge Ball¹

This becomes exciting as the players on one side try to win from the other side in a limited time.

Play Space: A circle 30 feet in diameter.

Ball: A large hollow ball, or basket or volley ball.

Game: Two teams of about equal strength. One team is within the large circle. The other team is divided into two groups that stand opposite each other along the edge of the circle. They throw the ball back and forth along any part of the circle, but not stepping inside. The object is to hit the players within the circle. When a player is hit, he is out, and leaves the circle. This game can be made as lively as boys and girls want to make it. Accurate throwing and quick action make the game the more interesting.

Catch Basket¹

The class stands in a circle around the room, each half constituting a team with a leader at one end. On a desk in the center of the room is placed a waste-paper basket. The game consists in throwing a bean bag or a ball (a large, light gas ball preferable) into the basket, the teams alternating their turns. There is no interference but an umpire stands in the center who returns the ball to the next player after each throw. The leaders throw first, and each player in turn thereafter. Each time the ball lodges in the basket it scores one for the team throwing. A bean bag on the edge of the basket scores as a goal. A player may throw but once at each turn. The game may be limited by time, the team winning which has the highest score at the end of 10 or 15 minutes; or it may end when each player has had a turn. The former method leads to quicker and more expert play, which should be encouraged.

¹ From *Course in Physical Training for Grades I to VI* for State of New Jersey.

C. PERFORMANCES MEASURED OR TIMED

Throwing

Shall it be the hand ball, slung from the arm, or the large hollow ball, with a push-throw straight from the shoulder, or what requires more skill yet, the throw made with a crouch and a final spring?



Wide World Photos

HURLING THE BASEBALL

This college girl made a new record in sending the ball a distance of 224 ft., $2\frac{1}{4}$ in.

The baseball throw described above is the sling throw, the basketball throw is from the shoulder. In throwing for distance, do not fail to consider the size and weight of the ball.

Baseball Throw for Accuracy (Boys and Girls)

1. Make two parallel lines of equal length thirty feet apart. Let players in groups of four stand close together on one line, the groups being three feet apart. Let the thrower stand on the

opposite line, call out the name of the player to whom he will throw the ball and stand directly opposite to this player. In three throws, see how many are accurate. Another now becomes thrower. The test continues in this way.

2. Throw a hand ball toward a very small circle on a frame 30 feet away. The small circle is within three or four larger circles. Name a score of 20 for the tiny circle, and then name scores for each of the larger circles, the largest circle having the smallest score. Let each player see how many scores he can make with three throws.

A Hop and a Leap Step

(Boys or Girls)

This time hop over the paper (making it narrower if necessary). To do this, keep the rear foot in the rear and spring forward on the foot that landed at the edge of the paper. Then quickly make a leap step, bringing rear foot forward and continue to run for a few steps.

Standing Hop, Step and Jump

(Boys)

Stand with both feet on the take-off and swing the arms for the start. Just as the final forward swing is being made lift one foot so the "hop" is taken from one foot only. Land on the same foot from which the spring was made, take a long step with the other foot, and finish with a big leap, landing on both feet. Do not slow up in speed between the hop, the step and the jump.

Throw Weights and Jump

(Boys)

Hold a stone in each hand, swing the arms back and forth to get a good spring, then throw the weights and jump. Take care that this is not done where there is danger of anyone being hit by the stones.

Standing Broad Jump

(Boys)

Soften the earth at the place of jumping; make a sand pit if possible. Make a solid place for the start. Have a well-marked toe line. Have other lines parallel to it and a foot apart so the jump can be easily measured. When making the spring aim to go high as well as forward. Keep a record to see what the gain is from month to month. Five to six and one-half feet is a passing record for a healthy boy 10 to 12 years old.

A Victory Leap

(Boys or Girls)

Most of the group stand in two parallel lines several feet apart, as spectators. One or more players whom the leader has chosen step to the open space between. A phonograph record is played; the music is some military selection that incites to victory. *Polonaise Militaire* is such a record. The players selected reach the right arm forward and slightly upward, then leap forward, leap after leap, the head up and eye following the hand. Others are chosen. The game may be played until all take part in it.

The Hop, Step and Jump Parade

(Boys or Girls)

In this, two lines are formed again. Those who know how to hop, leap and jump go to the open space between. The leader gives directions and they follow them. Other players join the parade as they are able to follow the directions.

Running Broad Jump

(Boys)

The length of run is unlimited. In a contest each competitor is allowed three jumps; the five best are allowed three more jumps. Winner may have three more jumps for a record.

The take-off may be an 8' by 8' timber about four feet long buried until the upper face is on level with the ground. In front of the scratch line for about four inches the ground should be kept sprinkled with sand, in order to detect stepping over. The take-off should be painted white or otherwise made conspicuous. Measurements shall be made perpendicularly from the front edge of the take-off to the nearest point where the body touches the ground. The landing area should be of loose dirt and raked smooth after each trial.

Stepping over the take-off shall constitute a trial.

D. RUNNING

There are three things we should especially note in good running. First there is one spring following another. Second, the legs



Wide World Photos

WINNING THE FIFTY-YARD DASH

swing straight forward and back. Motions to the side take away from the speed. Third, after good rhythm is gained, speed increases, and the running is faster toward the end of a run than at the beginning.

Walking and Running

(Boys or Girls)

Find a good walking stride. Walk until you are well in the rhythm of it, then change to running and after a few paces back again to walking. Practice this from time to time.

Relay Races

Be ready to start. Do not run too fast at first, then increase your speed.

Potato Race

(Boys and Girls separately¹)

Runner starts from basket, brings in one block and drops it in the basket; he brings in the second and touches the basket, replaces on the mark the second block, gets the first out of the basket and replaces that on the mark and returns — his time being taken as he crosses the line. In case a block does not fall into the basket, the runner is not required to return and pick it up; he is however charged for a "foul."

The older and faster runners have the basket and starting line ten feet farther back from the first block.

To cross the finish line within 42 seconds after the signal to start is a good record for a girl. The marks holding the blocks may be made distinct with paint. To make this run in good time the players should have rubber-soled shoes.

Potato Race Relay

This is played as described above, only there are two teams. Each team has its own starting line and marks. The players of

¹ After plan given in Reilly's New Rational Athletics.

Basket
Starting Line
24 feet (block)
8 feet (block)
Goal

each team stand in line, one behind the other, the foremost being beside the basket. At a given signal the first player of each team starts; as each finishes another player starts. The runners who have made the run go to the rear end of the line. The team that finishes first wins.

Simple Relay

(Boys and Girls together or separately)

Here is one of the easiest of relay races:

At a given signal first runner of each team starts, runs to and around a circle and returns touching the outstretched hand of next runner, who then makes the run as the first runner did and touches the hand of the next runner, so the runs are made until all have taken part. The runners as they finish go to the rear of the line. The game is finished when the last player returns and touches the hand of first runner, who is again at the front. The team who finishes first wins.

Hurdle Relay

(Boys and Girls separately)

In the Hurdle Relay the teams shall be lined up exactly as for the Simple Relay and the manner of running the race shall be the same, except that there shall be from one to three hurdles (according to the length of the course) for each pupil to jump over during the run.

The distance of a hurdle from the start or finish line shall be thirty feet and if more than one hurdle is used they shall be placed twenty-five feet apart. When one hurdle is used, the running distance must be 60 feet; when two are used, 85 feet; when three are used, 110 ft. Hurdles shall not be less than 18 inches nor more than two feet high.

Square Relay

Number of Players: Three to twelve or more on a team.

Equipment: Two balls or bean bags.

Place four objects from 15 to 30 feet apart in the form of a square like a baseball diamond. In these rules the bases are lettered *a, b, c, d* around the diamond. Team I lines up single file back of point *a*. Team II lines up single file back of point *c*, with sufficient space between the teams and the bases to allow the runners to pass outside of the bases freely.

Each leader holds a ball. On the signal to start the leader of Team I starts running around and outside of points *b, c, d*, back to *a*, and *hands* ball to second runner of his team. Leader of Team II starts running around outside of points *d, a, b*, back to *c*, and *hands* ball to second runner, etc. The team wins whose leader first receives the ball into his hands after all members of the team have run.

Variations: 1. A runner of Team I may throw the ball to the next runner of his team at any point between *d* and *a*, and a runner of Team II may throw from any point between *b* and *c*. If, however, a wild throw is made by the runner and the ball rolls into or beyond the square between points *a, b*, and *c* and *d*, the next runner must secure the ball and return to his starting point and encircle or include points *a* or *c* in his run. All four points must be included in the course. Failure to do so constitutes a foul. (See Scoring for All-up Relay — Bancroft, page 45.)

2. Walk with ball and hand to next runner.
3. Walk with ball and throw ball to next runner.
4. Walk backward with ball and hand to next runner.
5. Walk backward with ball and throw to next runner.

— *Manual Physical Education*, Public Schools of California.

E. STUNTS OLD AND NEW**Pulling Sticks ¹**

Two sit upon the floor, toes against toes. A broom handle is grasped by the players and at the signal each tries to pull the other up from the floor.

The Palm Spring ¹

Stand at some distance from and facing the wall. Lean forward, supporting the body with the palm of the hand against the wall. Now spring back to place without moving the feet.

Knuckle Down

Place the toes against a chalk line, and kneel down and rise again without help of the hands and without moving the toes from the line.

Stooping Stretch

Place the outer edge of the right foot against a line drawn upon the floor, also the left heel at a little distance behind the right. With a piece of chalk mark the floor as far away as possible by stooping forward and passing the hand between the legs, regaining position again without removing the feet from the line or touching the floor with either hand.

Pull Up Trunk

(Boys or Girls)

(Test of Strength and Body Control)

Lie flat on the back and fold arms across the chest. Keep the knees straight. Pull trunk up without turning on the side. Keep the head erect.

Full Knee Bend

(Boys or Girls)

(Strengthens Trunk. Endurance Test)

Make full knee bend, holding trunk and head erect, hands on hips. Hold the position until muscles tire.

¹ *Education by Plays and Games*, Johnson.

Side Hold ¹

(Boys)

The boys stand side by side. Boy No. 1 puts his right arm around Boy No. 2, over his left shoulder, and grasps him under the right arm. Boy No. 2 puts his left arm around Boy No. 1, under his right shoulder, and grasps him under his left arm. Boy No. 1, with his left hand, grasps the right hand of Boy No. 2. Both wrestle from this start until one wins a "fall."

The boy having the under hold has the advantage. Consequently, the stronger or larger boy takes the upper hold.



COMMON HOLD WRESTLING

Hand Wrestling¹

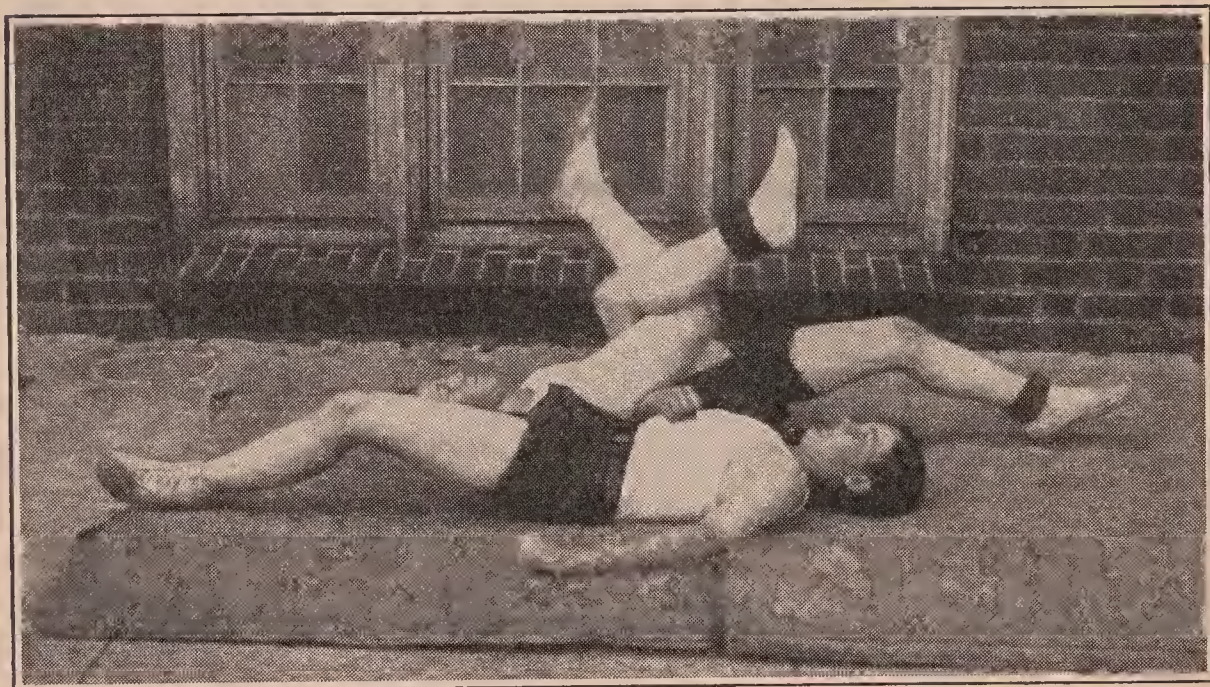
(Boys)

Two boys stand facing each other, grasp right hands, place the outsides of their right feet together, and step backward about 30 inches with each left foot. The object of the contest is to pull the opponent off his balance. When either foot of an opponent moves out of position it counts one fall. The original hand grip

¹ *Health by Stunts*, Pearl and Brown.



INDIAN WRESTLING NO. 1



INDIAN WRESTLING NO. 2

Legs swing upward; knees locked; then wrestlers try to pull each other over. must be held, but the body may be twisted and turned in any direction as long as the feet remain stationary. This wrestle may be done also by standing on the right foot only and holding the left

one in the air. In this case a fall is counted when the foot on which the opponent is standing moves out of place, or when the other foot or any part of the body touches the ground.

F. BALANCING

Spring Forward and Hold the Position

This is just opposite from the usual kick. In a long kick forward the leg is made to reach as far as it will. It is a spring kick and ends with a leg, arms and trunk reaching forward together. If the balance is kept, this position is easily held. Success in doing it indicates a free body. The trunk supports the arms and legs.

Spring Forward, Hold the Position and Squat

(Boys or Girls)

Make the spring as described above. Make it several times until the position is easy. Then squat, keeping the lifted leg straight front and the trunk still bending forward.

Knee Bend and Touch

(Boys or Girls)

(Requires good balance and easy control of the body.)

Stand on left foot. From behind grasp right foot in left hand. Touch bended knee to the ground and return to position without losing balance.

Knee Spring

(Boys)

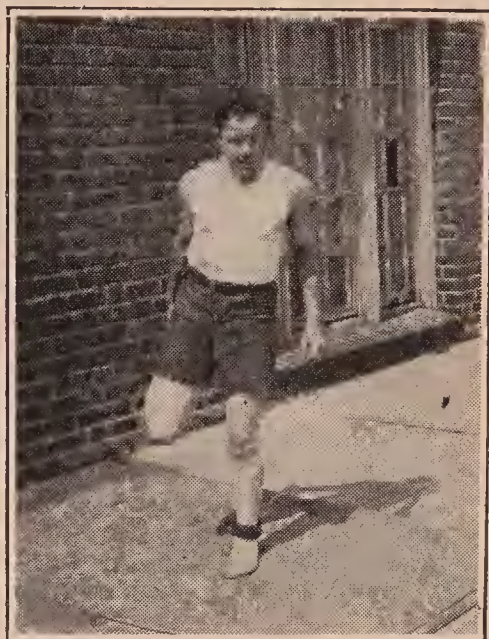
Boy No. 1 lies on his back with his knees up and his feet flat on the ground. Boy No. 2 takes a short run towards him placing his hands on the knees of Boy No. 1, and flipping his feet up over his head. Boy No. 1 aids him in landing by placing his hands so that the back of Boy No. 2 will strike them as he comes over.

— *Health by Stunts*, Pearl and Brown.

Forward Lunge

(Boys or Girls)

Lunge forward with trunk stretched straight to the front one leg stretched straight back, opposite arm straight forward.

**KNEE BEND AND TOUCH NO. 1 AND NO. 2**

Come up to position without touching hands to the floor.

On One Foot Balance

Stand on one foot, knee straight; bend the other knee, at same time lifting it high while trunk bends forward. Straighten to usual standing position, dropping the leg gradually and raising the trunk gradually.

Walk on the Edge of a Plank

A plank two by four inches and several feet long, standing on the two inch side, provides for this test. Walk the plank the entire length and back again without either foot touching the ground.

G. FEATS AND FORFEITS

Balance Wrestle ¹

Two contestants stand each in a forward stride position, the right foot being lengthwise on a line (the same line for both contestants) and the left foot back of it, turned at right angles to the right foot, with the heel touching the same line. The toes of the right feet should touch. In this position players grasp right hands. The objects of the game are to make the opponent (1) move one or both feet, or (2) touch the floor with any part of the body. A point is scored for the opponent whenever a player fails in one of these ways. After a trial has been made with the right hand and foot, the wrestle should be repeated with the left hand and foot extended, and so on alternately.

Lunge and Hop Fight ¹

A circle six feet in diameter is drawn on the ground. One player takes a lunge position forward, so that his forward foot rests two feet within the circle. The second player stands in the circle on one foot with arms folded across the chest. The hopper tries to make the lunger move one of his feet. The lunger in turn tries to make the hopper put down his second foot or unfold arms. Either player is defeated also if he moves out of the circle. The lunger may use his hands and arms.

Catch Penny

One elbow is raised level with the shoulder, the arm being bent to bring the hand toward the chest. Three or four pennies are placed in a pile on the bent elbow. Suddenly the elbow is dropped and the same hand moved downward quickly in an effort to catch the pennies before they fall to the ground.

¹ *Games for the Playground, Home, School, and Gymnasium* — Bancroft. Copyright by the Macmillan Co.

H. REQUIREMENTS FOR DAIRY MAID AND DRESSMAKER'S BADGE IN GIRL SCOUTS ¹

Dairy Maid

Symbol — Milking Stool

1. Take entire care of a cow and the milk of one cow for one month, keeping a record of quantity of each milking.
2. Make butter at four different times, and submit statement of amount made and of the process followed in making.
3. Make pot cheese; give method.
4. Name four breeds of cows. How can they be distinguished? Which breed gives the most milk? Which breed gives the richest milk?
5. What are the rules for feeding, watering and pasturing cows? What feed is best for cows? What care should be given cows to keep them in perfect condition? What diseases must be guarded against in cows? Why is it so imperative to have a cow barn, all implements, workers and cows scrupulously clean?
6. Of what is milk composed? How is cream separated from milk? Name two processes and explain each. How and why should milk be strained and cooled before being bottled or canned?

See Lesson XVII.

REFERENCES. — *Stories of Industry*, Vol. 2, A. Chase, Educational Pub. Co.; *How the World Is Fed*, F. G. Carpenter, American Book Co.; *Foods and Their Uses*, F. G. Carpenter, Scribner.

Dressmaker ¹

Symbol — Scissors

1. Must hold Needlewoman's Badge.
2. Must know the bias, selvage, and straight width of goods.
3. Must cut and make a garment from a pattern, following all

¹ *Scouting for Girls*.

rules and directions given. It is suggested that two girls work together on this.

4. Be able to clean, oil and use a sewing machine.

5. Demonstrate on other person the way to measure for length of skirt, length of sleeve, length from neck to waist line. Sew on hooks and eyes so they will not show. Hang a skirt, make a placket, put skirt on belt. Skirt must be hemmed evenly and hang evenly.

6. Know what to do if a waist is too long from the neck to the waist line and does not fit well.

See Lesson XVII.

REFERENCES. — *Complete Dressmaker*, C. E. Laughlin, Appleton; *The Dress You Wear and How to Make It*, M. J. Rhoe, Putman; *The Dressmaker*, Butterick Co.; *Clothing and Health*, Helen Kinne and Anna M. Cooley, Macmillan.

I. REQUIREMENTS FOR THE HANDICRAFT BADGE IN BOY SCOUTS¹

To obtain a merit badge for Handicraft, a scout must:

1. Paint a door.
2. Whitewash a ceiling.
3. Repair gas fittings, sash lines, window and door fastenings.
4. Replace gas mantles, washers, fuse plugs, and electric light bulbs.
5. Solder.
6. Hang pictures and curtains.
7. Repair blinds.
8. Fix curtains, portiere rods, or blind fixtures.
9. Lay carpets and mend clothing and upholstery.
10. Repair furniture and china.
11. Sharpen knives.
12. Repair gates.
13. Fix screens on windows and doors.

See Lesson XVII.

¹ *Boy Scout Manual*.

J. EXERCISES FOR THE FREE BODY

Stretches

The best kind of exercise for muscles is stretching. The photographic illustrations show four kinds of body stretches. These loosen the muscles and free them. In doing the stretches make sure that you pull and really stretch them. If one wants to relax and rest his body muscles, it is well to give them a thorough stretching first. Pliable free muscles keep one's body feeling fresh and new.

NOTE. — Thanks are due Mrs. Glenn Smith Tinnin of the Florence Noyes School of Rhythmics, Washington Branch, for the illustrations used in this section.



THE ARROW
STRETCH



THE SEAL STRETCH
A front trunk-abdomen stretch.



THE CAT STRETCH

A stretch on all fours.



AN ALL-THE-WAY-THROUGH STRETCH

Exercises for the Spinal Column

The spinal column will bend a little all along its parts. The muscle pad between each bone allows motion. By taking the position shown in the first picture on page 172, one can roll back and forward with a movement very like that of a rocking chair. This rolling movement is excellent for keeping the spinal column exercised and flexible.



FIRST POSITION



ROLLING BACKWARD



ROLLING FORWARD

The Body Relaxing

In the illustrations below the trunk is moved from the waist line and rolled round and round in one direction and then round and round in the other. See how comfortable and drowsy you can be when taking such exercise. See how free and agile your body feels after you have finished.



FIRST POSITION



SECOND POSITION



THIRD POSITION



FOURTH POSITION



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